

DOCUMENT RESUME

ED 397 592

EC 304 922

AUTHOR Walker, Sylvia; And Others
TITLE An Examination of Variables Related to the Cost of Purchased Rehabilitation Services Relative to the Needs of Persons with Disabilities from Diverse Ethnic Backgrounds. Revised.
INSTITUTION Howard Univ., Washington, DC. Research and Training Center for Access to Rehabilitation and Economic Opportunity.
SPONS AGENCY National Inst. on Disability and Rehabilitation Research (ED/OSERS), Washington, DC.
PUB DATE 95
CONTRACT H133B30093
NOTE 170p.
PUB TYPE Reports - Evaluative/Feasibility (142)
EDRS PRICE MF01/PC07 Plus Postage.
DESCRIPTORS Asian Americans; Blacks; *Costs; *Delivery Systems; *Disabilities; *Ethnic Groups; Hispanic Americans; *Minority Groups; Outcomes of Treatment; Program Costs; Racial Differences; *Vocational Rehabilitation; Whites
IDENTIFIERS African Americans

ABSTRACT

This study evaluated the delivery of vocational rehabilitation (VR) services to clients, broken down by group (White, African Americans, Native Americans, Asians, and Hispanics). It evaluated cost of services, process activities, racial/ethnic differences, and outcomes. A total database of 202,585 rehabilitation clients in 1991 was used for the initial analyses with more in-depth analyses conducted of a random sample of 28,138 clients who had completed rehabilitation programs. Overall, findings indicated that time in VR program, number of services provided, and type of disability were the most significant factors affecting cost of services. However, data also confirmed the presence of race/ethnicity effects at the national, regional, and agency levels. Such findings, although generally small in their overall effect size, were consistent and statistically significant. The problem appeared to be more prevalent among subjective disabilities as opposed to physical disabilities, in favor of Whites and Asians at the national and regional levels. The report presents background information on the study, its methodology, results, discussion, and conclusions/recommendations. A glossary explains codes used in the study. Appendices provide detailed stepwise multiple regression analyses by agency, region, race/ethnicity, and major disability. (Contains 41 references.) (DB)

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**AN EXAMINATION OF VARIABLES RELATED TO THE COST OF
PURCHASED REHABILITATION SERVICES RELATIVE
TO THE NEEDS OF PERSONS WITH DISABILITIES
FROM DIVERSE ETHNIC BACKGROUNDS**

(REVISED)

**SYLVIA WALKER
CHARLES ASBURY
ARMARDO RODRIGUEZ
R. C. SARAVANABHAVAN**

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FOR ACCESS TO REHABILITATION
AND ECONOMIC OPPORTUNITY**

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The Howard University Research and Training Center
for Access to Rehabilitation and Economic Opportunity
School of Education, Howard University, Washington, D.C.

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This publication was supported by a grant from
the U.S. Department of Education, National
Institute on Disability and Rehabilitation Research,
and the Rehabilitation Services Administration,
Grant Number H133B30093. The opinions expressed
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Acknowledgements

The authors would like to extend their warmest and sincere appreciation to those who have contributed to the completion of this report. We are especially appreciative of the support which we have received from Dr. Peggy Carr, Dr. Modibo Coulibaly, Dr. L. Deno Reed, Dr. Lu Ethel Green, Dr. Paul Leung, Dr. Faye Z. Belgrave, and Dr. Marilyn Johnson. Special thanks are given to Mr. Carlyle Mose, Ms. Meselech Haile-Michael, Ms. Janis Brown, Ms. Lucy Wong-Hernandez, and staff members of the Rehabilitation Services Administration. We are also grateful for the support we have received from the Howard University School of Education, the National Institute of Disability and Rehabilitation Research, and the Rehabilitation Services Administration of the U.S. Department of Education.

EXECUTIVE SUMMARY

AN EXAMINATION OF VARIABLES RELATED TO THE COST OF PURCHASED REHABILITATION SERVICES RELATIVE TO THE NEEDS OF PERSONS WITH DISABILITIES FROM DIVERSE ETHNIC BACKGROUNDS

A recent report of the General Accounting Office (GAO) identified differences in the amount of purchased services dollars at Vocational Rehabilitation (VR) agencies spent on White Americans in comparison to individuals from various racial/ethnic minority populations. The findings were obtained from the Case Services Report (Reported on RSA 911). Specifically, the report for 1991 suggests some variations in delivery of services and cost among various groups.

The purpose of this study was to continue the analysis and evaluation of the program's effectiveness in light of the finding indicating racial/ethnic variations. The primary objectives were to verify the existence of such variations and to determine the extent and source of such differences.

The data analyzed in this study consisted of 202,585 clients representing the nation's population of clients across all agencies, regions, and racial/ethnic groups who received services in 1991. Many of the initial analyses for this study, including some of the cross-tabulation analyses, were conducted on the population data base to obtain descriptive profiles on important variables like race/ethnicity, major disability, cost of purchased services, and the interrelationships among them. In

addition, the population parameters were useful in addressing some of the research questions.

However, for most of the analyses, a sample of 28,138 clients was randomly selected. A major selection criterion was closure status; clients who had completed the program were selected. With the exception of Native Americans and Asians, who were too small to sample, all other racial groups were randomly represented in the sample.¹

As a starting point for understanding the cost of services for each race/ethnic group, it was first determined that the distribution of groups was 72.4% for Whites, 17.5% for African Americans, .62% for Native Americans, 1.04% for Asians, and 8.4% for Hispanics. These data were important since they represented a standard for determining over or under representation of groups in various categories (e.g., cost categories).

The research questions, which provided the framework for the study were conceptualized into three major sets of analyses: (a) those pertaining to cost of services; (b) those pertaining to racial/ethnic differences and process activities; and (c) those pertaining to outcome. Outlined below are the major findings relevant to each of the three sets of analyses.

¹It should be noted that all Native Americans and Asian Americans were included in the sample.

It should also be noted that the terms African Americans and Blacks and Native Americans and American Indians are used interchangeably throughout this document.

Major Findings for Cost of Services

In general, the findings confirmed the presence of racial/ethnic differences in cost of client services. Of clients who completed the program, White clients tended to have more money spent on their program services than did clients from other groups. The findings from the current analysis also demonstrated that Asian clients may have had slightly more money spent on their services compared to other minority groups. Although the pattern did vary from region to region in the country, being African American, Hispanic, or Native American was typically not so positive as being White or Asian when it came to monies spent.

However, it was noted that the extent of the race/ethnicity effect, although significant, tended to be relatively small in comparison to other factors such as time in the VR program, number of services provided, and the type of disability. Some of the highlights of the findings related to cost of purchased services are listed below:

- Time in VR and number of services were consistently found to be the best predictors of cost of purchased services across the nation, across the regions, and across almost all of the disabilities analyses. But it is also noteworthy that none of the prediction equations accounted for more than half of the variance in cost of services.
- A clear pattern emerged indicating that major disabilities pertaining to major physical and sensory

conditions (e.g, orthopedic conditions and blindness) tended to be associated with higher client cost than disabilities involving more mental health and social disorders (e.g., drug abuse, mental retardation, and psychotic disorders).

- Across the various disabilities, within the ten different regions, race/ethnic membership was a significant predictor of cost of services about 10 percent of the time; but in general, the effect size was small.
- Within the framework of a race/ethnicity effect, however, Whites and Asians appeared to have had more money spent on them when it came to cost of services; but there was some evidence at the national and regional levels to suggest the problem was concentrated in disabilities such as drug abuse and mental retardation. That is, racial/ethnic differences were rarely found for clients with physical and sensory disabilities such as orthopedic conditions and blindness.
- The racial/ethnic effects were particularly apparent in several of the agency analyses for both physical and mental disabilities alike. In addition, those effects tended to be larger, but not necessarily always in favor of a particular racial group.

Major Findings for Process Activities

In general, little evidence for differences in services provided emerged from the findings. No substantial differences in type of services provided were noted for the various racial/ethnic categories of clients.

Some of the highlights of the process activities analyses include:

- clients who received transportation services, adjustment training, and on the job training outside of the agency tended to have higher weekly earnings at the end of the program;
- however, whether, such training was received in-house or not, did not vary by the racial/ethnic membership of the client.

Major Findings for Outcome Measures

In general, the outcome analysis revealed that "success" most notably, as defined by more weekly earnings and work status at closure, was associated with economic characteristics of the client during the course of the program. Highlights of these findings include:

- clients with higher educational levels and more economic independence at program entry had higher weekly earnings at closure;
- employed clients had more services provided to them during the program and were more economically independent at program entry than unemployed clients;

- employed clients had slightly more money spent on them during the program than unemployed clients.

Conclusions

The findings indicate that time in VR program, number of services provided, and the type of disability were the most significant factors affecting cost of services for the 1991 clients. However, the data also confirmed the presence of race/ethnicity effects at the national, regional, and agency levels. Such findings, although generally small in their overall effect size, were consistent and statistically significant. The problem appeared to be more prevalent among subjective disabilities as opposed to physical disabilities in favor of Whites and Asians at the national and regional levels.

There was little evidence that the type of program's process activities varied by racial/ethnic category, but clearly some of the services were more likely to be associated with positive outcomes than others (e.g., out-side transportation).

In the final analysis though, the more educated, economically independent clients who received more services, and had more money spent on them had a higher probability of positive program outcomes (e.g., employment status and earnings). Such clients tended to be Whites and Asians.

BACKGROUND

According to the 1990 Census, the United States population percentages are: White Americans 76.3%; African Americans 11.5%; Hispanic Americans 8.6%; Asian Americans 2.8%; and American Indians 0.75%. Reports on the prevalence of disability suggest that minority persons with disabilities represent a substantial proportion of the total disabled population of the United States. The prevalence and incidence of various disabling conditions among various groups of individuals are under study.

Dr. Paul Leung (1993) addresses the changing demography of the United States and how that change will affect state/federal vocational rehabilitation. During the last decade, the population of the United States has changed significantly with regard to its ethnic, racial, and cultural background. Because of this shift, vocational rehabilitation as well as other service delivery programs must respond to these demographic changes in order to be effective.

Data reveal that there is a decline in Americans identifying themselves as White (80.3%). There was also an increase in immigration in the 1980's. These changes in demography indicate that various rehabilitation delivery systems must be able to accommodate diversity within the organizational structure. Demographic changes present the challenge of shifting from a clientele with similar values and views to a more diverse and different population of perspectives, world views, and varying rehabilitation service needs.

Status of African Americans with Disabilities

Over half, 52.7%, or about 16 million African Americans are concentrated in the Southern region of the U.S. The remainder are in the Northeastern (18.7%), Midwestern (19.1%) and Western (9.4%) regions of the U.S.

In general, working age African Americans (between 16-64 years of age) tend to experience numerous economic disadvantages. They tend to have a higher unemployment rate, 13.9% for males and 11.9% for females, as of March 1988, than comparable U.S. citizens in general, 6.2% and 5.2% for males and females, respectively (U.S. Bureau of the Census, 1989). Of the African Americans who worked year-round full-time jobs in 1987, mean annual income was lower (\$19,350) than that of the total Americans of working-age (\$25,662). The mean for this age group that worked at any point during 1987 was \$14,244 for African Americans, and \$18,951 and \$19,482 for the general adult population and Whites, respectively.

Of the African Americans between 25-64 years of age in 1988, only 15.6% were college graduates compared to 22.6% of all Americans in this category. Approximately 22% of African Americans in this age range had completed less than 12 years of schooling, compared to 15.7% of the general population in this age group.

Of the estimated 13,420,000 working-age adults with a disability, approximately 2,512,000, or 18.7% are African Americans. This represents roughly 13.7% of African Americans in this age group (16-64) who account for only 11.7% of the overall 16-64 working age population (Bowe, 1991). Approximately 24.2%, or

1,803,000, of the working age individuals with severe disabilities are African Americans. African Americans with a severe disability account for a high 71.8% of all African Americans with a disability. Whites, by contrast, were just 63% of persons with severe disabilities, and only 52% of Whites with a disability are severely disabled (Bowe, 1991).

African Americans account for 22% of persons with a disability who are unemployed or not working. The 1,973,000 African Americans with a disability who are not working represent 78.2% of all African Americans with a disability who are unemployed; 46% are male and 53.6% are female. By contrast, African Americans are underrepresented among persons with disabilities who participate in the labor force; they account for only 12.9% of individuals with disabilities who are working, far below their 18.7% of individuals with disabilities. The percentages are even lower for African Americans males (9.8%) and slightly higher for females (16.8%).

Most African Americans with disabilities are female (54.5%) rather than male (45.5%). Of the males and females with a disability in the U.S. population, African American males and females account for 17% and 20.4%, respectively; neither of which is closely aligned with their participation in the labor force, 9.8% and 16.8%, respectively, nor with the unemployment rate at 25% for African American males and 24.7% for African American females. In fact, the unemployment rate for African Americans with a disability is almost double the 14.2% rate among individuals with a disability overall (Bowe, 1991).

In 1987, the median income of all working-age African Americans with work disabilities who participated in the labor force was \$6,865 and the mean was \$9,940. Among Whites the median and mean incomes were \$12,299 and \$16,425, respectively. The figures are even more depressing when only income from participation in the labor force is considered. The mean income for African Americans with a disability who worked in 1987 was \$8,894 compared to \$12,689 and \$10,261 for Whites and Hispanic Americans.

When the income for males and females are evaluated separately, a similar pattern emerges. The mean incomes for African American males with a disability who participated in the labor force in 1987 was \$11,876 compared to \$15,869 and \$12,213 for White and Hispanic males. For African American females, it was \$6,432 compared to \$8,340 and \$7,559 for White and Hispanic females.

Status of Hispanic Americans with Disabilities

The Hispanic American population is a widely diverse segment of the American population. Their racial composition includes both Blacks and Whites. Currently, 22 million people, or approximately 9% of the U.S. population are of Hispanic descent. Mexican Americans, or Chicanos, account for approximately 12 million, or 54.5% of the Hispanic American population. Approximately 45.2%, or roughly 10.1 million Hispanic Americans reside in the Western region of the U.S. The remainder are in the Northeastern (16.8%), Midwestern (7.7%), and Southern (30.3%) regions of the U.S.

Like African Americans, when compared to the general working-age U.S. population, Hispanic Americans tend to experience many disadvantages (Bowe, 1981, 1991; Leal-Idrogo, 1993). In 1988, Hispanic Americans tended to have a higher unemployment rate than the working-age population overall (8.1% vs. 5.7%), particularly among males (9% vs 6.2%). They tended to have lower income from year round full-time work (\$19,413 vs \$25,662); and, of those who worked at any point during 1987, the mean income was \$14,440 compared to \$18,951 and \$19,482 for the working-age population over all and Whites.

Hispanic Americans between 25-64 years of age tend to have less education than all adults within this age group (Bowe, 1991). For example, in 1988, only 13.5% were college graduates compared to 22.6% of all Americans in this age group. Approximately 44% of Hispanic Americans have less than 12 years of formal education (over 50% of which have less than eight years of education), compared to 15.7% of all Americans in this age group.

Of the estimated 13,420,000 working-age Americans with disabilities, approximately 1,012,000 or 7.5% are of Hispanic origin. This represents about 8.2% of all Hispanic Americans in this age group. Approximately 686,000, or 9.2%, of the working-age population with disabilities are of Hispanic origin. Hispanic Americans with a severe disability account for an overwhelming 67.8% of all Hispanic Americans with disabilities.

For working-age Hispanic Americans with a disability, about 76.8% or 777,000 do not work. Of the Hispanic Americans who are

not working, 8.7% are men and 8.2% are women. This amounts to approximately 48.4% of the males and 51.6% of the females who are of Hispanic origin and are out of the labor force. By contrast, Hispanic Americans are underrepresented among persons with disabilities who participate in the labor force; they account for only 5.5% of individuals with a disability who are working. This is below their 7.5% of all individuals with a disability in this age group. A similar pattern exists for both Hispanic American males (6.1%) and females (4.7%).

Unlike African Americans, most Hispanic Americans with disabilities are male (51.8%) rather than female (48.2%). Of all the working-age males and females with a disability, Hispanic American males and females account for 7.8% and 7.3%, respectively. Although these figures are slightly lower than the percentage of Hispanic Americans with a disability who are not working (9% for males and 8% for females), they are somewhat higher than the 6.1% of males and 4.7% of females who are working.

Almost half (47.5%) of Hispanic Americans with disabilities have less than 12 years of schooling (of which about 50% have fewer than 8 years of schooling). Among those who have less than 12 years of formal education, approximately half are female. The lack of education among Hispanic Americans probably accounts for the fact that 27% of those with a disability live on or below-poverty income (Bowe, 1991; Leal-Idrogo, 1993).

The median income of all working-age Hispanic Americans with disabilities who participated in the labor force was \$11,568 and

the mean was \$12,266. Among Whites, the median and mean income were \$12,299 and \$16,425, respectively. When only the income from participation in the labor force is considered, Hispanic Americans earned \$10,261 compared to \$12,689 for Whites. A similar pattern emerged for males and females separately. The mean income in 1987 for Hispanic males with a disability was \$12,213 compared to \$15,869 for White males. For Hispanic females, it was \$7,559 compared to \$8,340 for White females.

Status of Asian Americans and Pacific Islanders with Disabilities

The March 1991 census estimated the Asian American and Pacific Islander population in the U.S. to be approximately 7 million, comprising of approximately 3% of the total U.S. population. Of the estimated 7 million, Asian Americans account for about 95% and Pacific Islanders about 5%. Approximately 59%, or roughly 4.13 million, reside in the Western region of the United States. The remainder are in the Northeastern (17%), Midwestern (10%), and Southern (14%) regions of the U.S.

Educational attainment by Asian Americans and Pacific Islanders has been traditionally high. At the same time, studies indicate that considerable variation in educational attainment exists. The 1980 Census data indicate that the proportion of persons 25 years of age and older among the Asian American groups completing high school varied from 82% for Japanese Americans to 62% for Vietnamese Americans. Among Pacific Islanders, the range was from 68% for Hawaiians and Guamanians to 61% for Samoans. In comparison, 81% of Whites completed four years of high school.

The largest educational attainment difference is at the college level. The proportion of Asian Americans and Pacific Islanders (39%) who completed four or more years of college was almost twice that of Whites (22%). However, subgroup differences show that some Asian American and Pacific Islander groups have a significantly lower proportion of college graduates, as compared to the general population of college graduates. Again, 1980 figures indicate that 12.9% of Vietnamese, 9.3% of Pacific Islanders, and 7.7% of Cambodians were college graduates.

The median income of Asian American and Pacific Islander males (\$26,760) working year-round, full-time was lower than that of comparable White males (\$28,880). The median income of year round, full-time Asian American/Pacific Islander females (\$21,320) was higher than that of comparable White females (\$20,050). Median income of Asian American and Pacific Islander workers 25 years and older working year-round, full-time with a high school education was lower (\$19,290) than that of comparable Whites (\$22,050). Asian American, Pacific Islander, and White females with equivalent educational attainment were more likely to receive similar earnings than were Asian American and Pacific Islander males as compared to White males. The median earnings ratio of Asian American and Pacific Islander females as compared to White females was .96 (\$16,920 compared to \$17,550) at the high school level and 1.00 (\$29,150 compared to \$29,110) at the college level. However, comparable male ratios were .79 (\$21,060 compared to \$26,530) at the high school level and .90 (\$37,550 compared to \$41,660) at the

college level. Despite the relatively high educational and income levels of Asian Americans and Pacific Islanders, a higher percentage of Asian Americans and Pacific Islanders (11%) live in poverty than do White families (8%).

Information about persons with disabilities who are Asian Americans and Pacific Islanders is scant. The limited data available come from the 1990 and 1991 Annual Report of the Rehabilitation Services Administration. Of those persons reported rehabilitated in 1990, Asian Americans account for only 1.3%. This is in contrast to their total percentage of the U.S. population of 2.8%. Other data from the Annual Report also suggest lower participation rates of Asian Americans as opposed to the majority population. For example, the profile of clients served by state Independent Living agencies for FY 1991 indicates the percentage of Asian Americans or Pacific Islanders at one percent. Another indicator of participation available in the Annual Report are data related to participation under the Client Assistance Programs, whereby clients receive advocacy or ombudsperson assistance. Only 1.3% of the clients served in FY 1991 were of Asian descent. Although this is an increase from the one percent of FY 1990, it indicates relatively lower participation than might be expected. While these data must be interpreted with some caution, they do illustrate the fact that Asian American participation in vocational rehabilitation and related programs is much lower than what would be expected, given their percentage within the general population.

Status of American Indians with Disabilities

According to the 1990 U.S. Census of population, there were 1.96 million American Indians (49.3% male and 50.7% female). Nearly 50% of all American Indians live in rural areas. Although American Indians comprise less than 1% of the total population, they have the highest disability rate (21.9%) compared to all race/ethnic groups in the country (McNeil, 1993). Among those who have severe disabilities, American Indians rank the second highest with a 9.8% prevalence rate, as compared to African Americans who have a 12.2% prevalence of severe disabilities (McNeil, 1993). American Indians continue to be overrepresented among persons with disabilities and they are underrepresented among those who receive state and federal services because of poor economic conditions and low educational attainment. In addition, American Indians with disabilities lack easy access to services due to distance, cultural, and sometimes, language problems. (O'Connell, 1987; Joe, 1988).

There are approximately 500 federally recognized American Indian tribes and Alaskan native villages. These tribes and native villages greatly vary in size, population, language, religious practices, economic activities, and geographic location. However, it does appear that American Indians as a subpopulation share common characteristics in the areas of education, health, employment and income. American Indians, in general, have lower educational attainment compared to other race/ethnic groups. Among persons who were 25 years or older, only 55.8% of American Indians

were high school graduates compared to the national high school graduate rate of 66.5%. In addition, American Indian students had a higher school dropout rate. In 1988 for example, 35.5% of Indian students dropped out compared to 28.8% for the U.S. population (National Center for Education Statistics, 1988). American Indians living on or off the reservations seem to be in poorer health conditions compared to the general population. Disproportionately higher rates of mortality, suicide, alcohol abuse, mental health problems, diabetes, heart disease, cancer, cirrhosis, and visual impairments have been reported for American Indians (O'Connell, 1987; Hodgekinson, 1992; Indian Health Service, 1990; Saravanabhavan, Martin, & Saravanabhavan, 1994). The unemployment rate, especially for those who live on reservations and Alaskan native villages, is much higher than the general population (U.S. Bureau of the Census, 1980; 1990). In general, American Indians living on reservations or in urban areas appear to have lower incomes compared to the general population. Poor economic conditions are even more pronounced for American Indians with disabilities. In recent studies conducted by the American Indian Rehabilitation Research and Training Center, 40 to 50 percent of American Indian persons with disabilities living in Denver, Minneapolis, and Dallas reported annual incomes of less than \$5,000. (Marshall, Johnson, Martin, & Saravanabhavan, 1990; Marshall, Day-Davilla, & Mackin, 1992; Schacht, Hickman, & Klibaner, 1993).

Despite the fact that they have a higher prevalence of disabling conditions, American Indians are less likely to seek vocational rehabilitation services and are less likely to be successfully rehabilitated compared to the general population (Morgan, & O'Connell, 1987; Marshall, Johnson, Martin, Saravanabhavan, & Bradford, 1992). Although the Rehabilitation Act has authorized reservation-based tribally operated vocational rehabilitation projects and specialized services such as the use of native healers, there is an inadequate number of such projects. There are only about 15 tribal VR projects in the country. These projects face stiff challenges. They are severely underfunded and they often face acute shortages of qualified personnel and training (Lonetree, 1990; Martin Jr., & O'Connell, 1986).

A Comparison of the Participation of Minority Persons in the Vocational Rehabilitation System

The service delivery and employment outcomes of minority persons with a work-related disability who participate in the state vocational rehabilitation programs have been shown to reflect inequalities (Atkins and Wright, 1980; Atkins, 1988; Walker, 1986, 1991, 1993). For example, in their review of national closure data of participants in the public rehabilitation system, Atkins and Wright (1980) found unequal treatment of African Americans in all major dimensions of the public vocational rehabilitation process. These inequalities were found to exist throughout all regions of the country. For example, a larger percentage of African American applicants were not accepted for services; and of the applicants accepted for services, African American clients were less likely to

be rehabilitated. They were frequently screened out without receiving much needed services; and African Americans received less vocational rehabilitation educational services, training, and financial aid for colleges, universities, business schools, and vocational schools than their White counterparts. A similar pattern was observed by Leal-Idrogo (1993) among individuals of Hispanic origin with disabilities.

In her analysis of the participation and outcome characteristics of Hispanic Americans with disabilities who participated in the public vocational rehabilitation programs in 1989, she noted several startling findings:

1. Of the 49,630 applicants of Hispanic origin, 46%, or 22,927, were not accepted for services; and
2. Of the 26,703 accepted for services, 9,250, or 35.7%, were closed without being rehabilitated.

Like other minority persons with disabilities, many Asian Americans and Pacific Islanders frequently find difficulty in the public vocational rehabilitation programs as well. It is estimated that as many as 50% of Asian Americans who participate in the state vocational rehabilitation programs are terminated prematurely (Leung and Sakata, 1988; Marshall, Wilson, & Leung, 1983; Chon, Lom, Wong, Leung, & Fong, 1988). According to Woo (1991), cultural factors such as linguistics, values, beliefs, etc., often serve as barriers to effective treatment and other rehabilitation services provided by practitioners. Asians, just as Hispanics and African Americans, are often closed with the status "failure to cooperate,"

"unable to locate," or "handicap too severe" (Leung & Sakata, 1988; Marshall, Wilson & Leung, 1983). It is suggested that the reasons minority persons are not rehabilitated at closure are closely linked to linguistic and cultural barriers.

Perhaps it is a lack of cultural sensitivity which accounts for the variation in outcome data between Whites and minority groups who participate in the vocational rehabilitation programs throughout the United States. For example, in a study of clients entering and exiting the New York State Rehabilitation System, Ross and Biggi (1986) found that rehabilitation rates increased by 4% for Whites and decreased by 4.5% for minority clients. At closure, Whites were most often cited, "refused services," while minority persons were cited, "failure to cooperate." In addition, Whites were closed, "rehabilitated at/above minimum wage," while minority persons were most often assigned the status "non-rehabilitated." Similar outcome characteristics were found by Danek and Lawrence (1982), Walker et.al (1986), Akpati, Roberts, Palmer, and Newsome (1986), and Santiago (1988).

An Examination of 1991 (911) Case Services Report Data

A recent report of the General Accounting Office (GAO) identified differences in the amount of purchased services dollars that Vocational Rehabilitation (VR) agencies spent on White Americans in comparison to individuals from various racial/ethnic minority populations. Information is reported to the Federal Rehabilitation Services Administration (RSA) annually on Form RSA

911. The report for 1991 suggests some variations in delivery of services and costs among various groups.

A number of mandates which are relevant to meeting the needs of persons with disabilities in multicultural communities are included in the 1992 Amendments to the Rehabilitation Act. Even though efforts are underway to increase service delivery and rehabilitation outcomes to these populations, there is a need to continue the study and evaluation of program effectiveness.

Information from the RSA 911 reports for 1991 is being studied and analyzed to assist in shedding light on the apparent cost variation. It is possible that the variation in cost of services could be an artifact of parameters other than race/ethnicity.

According to the RSA 911 reports, African Americans, Hispanic Americans, American Indians, and Asian Americans are represented in State rehabilitation caseloads in proportion to their numbers among persons with major disabilities. There are variations in representation of subgroups when considering specific States or regions of the country. Of all working age persons with disabilities, African Americans represent 18.7%; Hispanic Americans 7.9%; Asian Americans 1.2%; American Indians 0.6%; and White Americans 71.6% (Bowe, 1991).

METHODOLOGY

The data consisted of 202,585 clients representing the nation's population of clients across all agencies, regions, and racial/ethnic groups who received services in 1991. Many of the initial analyses, including some of the cross tabulation analyses, were conducted on the population data base to obtain descriptive profiles on important variables like race/ethnicity, major disability, cost of purchased services, and the interrelationships among them. In addition, the population parameters were useful in addressing some of the research questions.

However, for most of the analyses, a sample of 28,138 clients was used. A major selection criteria was closure status; only clients who had completed the program were selected. In addition, there were several other critical reasons for reducing the sample size. First, the initial examination of the data properties revealed unusual distribution of one of the major dependent variables -- cost of services. The data were characterized by a very "rough" and "limpy" variance, which was extremely skewed toward the negative end of the distribution. Table 1 provides some pertinent statistics for the cost of service variable. These data clearly show that the distribution is quite unusual. The range of cost was \$0 to \$100,000 with a standard deviation of \$4,416.

TABLE 1

Descriptive Characteristics of the Case Services Report File

Total Amount of Services Purchased by all Agencies (all Racial Groups)	\$509,707,395.00
Total Number of Clients Computed	202,585
Average Amount of Service Cost (All Clients)	\$2,516.02
Standard Deviation	\$4,416.90
Minimum Amount of Services Purchased	\$0.00
Maximum Amount of Services Purchased	\$99,999.00

One of the most obvious and undesirable artifacts of the distribution were correlations that were all extremely high (e.g., high 90's). We were also concerned when popular data

transformation techniques did not improve the problem when the variable was correlated with other factors with different but normal distributions. Thus after: (a) consultation with experts at Statistical Analysis System (SAS), and (b) reviewing the statistical methodology applied in cases of vocational rehabilitation programs with data bases of similar magnitude, it was decided to stratify the populations, when possible, into analyses for samples by disabilities. This approach in effect "normalized" distribution for analysis by segmenting the original distribution. For example, the cost of services for the orthopedic

disabilities were all on the high end of the distribution, while the cost of services for disabilities, such as mental retardation and drug abuse, were at the lower end of the distribution. Comparing clients with like disabilities had the effect of smoothing out the distribution under consideration.

A second major reason for reducing the sample size was the level of artificialness manifested in the significant levels of tests using the entire populations. That is, when the population data were used, almost every analysis, regardless of the magnitude of the relationship, was found to have extremely high significant levels.

A third factor contributing to the decision to reduce the sample size was system related. The large population data base presented data storage and computer system execution problems. For example, it was not physically possible to store such a large data base on the University's system hard drive for any reasonable length of time without significantly hampering access for other users. The alternatives would have been to use a tape mounting procedure, which requires an operator to be on call. The data base was contained on several tapes. Also the system's execution of large data bases, especially for some types of statistical analysis, was extremely slow and counter productive. Clearly a more manageable data base was needed.

In the final analysis, the sample of 28,138 was selected to represent a random sample of clients who had completed the program within each of the fourteen major disabilities. The sample of

28,138 was the optimum sample size for conducting analyses within disabilities. With the exception of the Native American group and the Asian group which were too small to sample, it should be noted that all other racial/ethnic groups were randomly represented in the sample.

However, as a starting point for understanding the distribution of cost of services across the different racial/ethnic groups, it was important to examine the entire data base as shown in Table 2. The percentage distribution was 72.4% for Whites, 17.5% for African Americans, .62% for Native Americans, 1.04% for Asian Americans, and 8.4% for Hispanics. These statistics are important as they represent a standard for comparison for other analyses, such as the representation of these groups among cost of services categories. Significant deviations from the populations representation in subcategories suggested possible differential treatment.

TABLE 2

Distribution of Service Cost by Race/Ethnicity

Race of Client	Number of Clients	% of Total	Total Expenditure	% of Total
White	146,753	72.44	\$390,700,200.00	76.65
African American	35,379	17.46	\$72,303,013.00	14.19
Native American	1,247	0.62	\$2,508,318.00	0.49
Asian	2,098	1.04	\$5,148,828.00	1.01
Hispanic	17,108	8.44	\$39,047,036.00	7.66
Total	202,585	100.00	\$509,707,395.00	100.00

As outlined in the proposal, this project addressed several important questions, many of which were phrased in terms of state and national relationships. However, it should be noted that feasibility, including fiscal constraint, lead to the decision to conduct regional analyses. In addition, for technical and methodological reason, it should be noted that national patterns were often inferred from regional patterns. The specific research questions addressed in this design are listed below:

1. What are the significant variables that explain the variance in cost of services?
2. Are there combinations of theoretical or social variables that account for the cost variations between Whites and individuals of minority status?
3. What is the order of importance among the variables that account for the cost of services?
4. How much of the variance in cost of services is accounted for by race/ethnicity?
5. How much of the variance in cost of service is accounted for by the specific variable of educational level, severity and type of disability, age, sex, race, etc., across states and within each state? How do these findings relate to the national pattern?
6. Are there any differences among the dominant factors that account for the variance in cost of services nationally and cost of services for each state?

7. What services show variation in delivery according to race/ethnicity and what variables are they related to (e.g., type of disability)? Is the national pattern similar to the state and regional patterns?
8. To what extent are there differences among ethnic groups in the costs for "Purchased" services and for "in-house" services?
9. To what extent are differences in closure status and other economic outcomes related to cost of services provided?
10. Are reported purchased service amounts predictive of clients' economic outcomes and gains?
11. Is there an association between levels of expenditure and client outcomes?
12. If more money is spent on a client, is he or she more likely to be placed into jobs providing higher levels of wages?
13. Does a higher level of expenditure mean that the client will typically show a greater gain in economic functioning from application to closure?

Statistical Analysis Approach

The research questions were conceptualized into three categories of issues in order to facilitate the statistical analysis plan. The categories included: (a) those pertaining to the factors which implement cost of services--questions one through six; (b) the questions exploring the differential relations of

race/ethnicity and process variables-- questions seven and eight; (c) and those examining differential outcome--questions nine through thirteen.

Table 3 lists the three major categories of research probes and describes the analytical approach to each. For the first category of questions pertaining to predicting cost of services, a series of regression models were employed.

Those models, shown in Figure 1, included: (a) disability models, in which a stepwise regression was conducted for each of the fourteen major disabilities with race/ethnicity, other relevant demographics, and social program variables as predictors; (b) race/ethnicity models, in which a stepwise regression was conducted for each of the five racial/ethnic groups, using type of disability, relevant demographics, and social and program variables as predictors; and (c) regional models, in which a stepwise regression was conducted for each of the ten regions using type of disability, race/ethnicity, other relevant demographics and social and program variables as predictors.

TABLE 3

**Summary of Statistical Analysis Approach to
Project Research Questions**

Research Question	Description of Analytical Approach
Predicting Cost of Services Questions 1 & 3 Question 2 Question 4 Question 5 & 6	These questions addressed issues of significant variance in the cost of service variable. The fully saturated regression model and the disability regression models were used to answer these questions. This question sought to identify those variables that account for racial/ethnic differences. The race/ethnicity regression models were employed for this question. The importance of race/ethnicity in accounting for variance in cost of service was addressed in the fully saturated regression model, the disability models, and the race/ethnicity regression models. Dominant factors account for variance in cost of services that vary by nation and state were addressed by the regional regression models and by the fully saturated regression model.
Racial/Ethnicity Differences in Process Question 7 Question 8	Race/ethnic differences in service delivery was handled by 2-way crosstabulation analyses. Race/ethnic group differences in cost of purchased services were addressed by X^2 and Cramer's V.

TABLE 3 (cont'd)

Research Question	Description of Analytical Approach
Race/Ethnicity Differences in Outcomes Question 9	The impact of closure status and other economic outcomes in cost of services was addressed with F-tests.
Question 10	The predictive capability of cost of services relevant for hourly wages, weekly earning, and other continuous level outcome variables were addressed using regressions.

Two other sets of regressions, not shown on Figure 1, were also conducted. Those included: (a) stepwise regression models for interaction of samples of each of the fourteen major disabilities by each of ten regions; and (b) the completely saturated regression models in which all relevant predictor variables were included and none used as a selection factor. The regression models involving select groups, however, were very important because they provide the most direct test of the research questions. That is, in determining the possible discriminatory role of race/ethnicity, it is important to hold constant as many relevant factors as possible (e.g., the type of disability and the location where the service was provided).

FIGURE 1
Regression Models Schemata for Cost of Services

	Disability Models	Race Ethnicity Models	Regional Models
Criterion Variable	Cost of Services	Cost of Services	Cost of Services
Predictor Variable	Regressed on Race/ethnicity; gender; grade; no. of services; time in VR; referrals; secondary disabilities	Regressed on Gender; grade; no. of services; time in VR; referrals; primary and secondary disabilities	Regressed on Race/ethnicity; grade; gender; no. of services; time in VR; referrals; primary and secondary disabilities
Conditioning Variable	As a function of <u>DISABILITY</u> Blind Other visual impairment Deaf Hearing Impaired Ortho Limb Ortho 1 up Ortho Upper Ortho Lo Ortho Other Absence Psychotic Drug Abuse Mental Retardation Other	As a function of <u>RACE</u> White vs. Others Blacks vs. Others Hispanics vs. Others Asians vs. Others Native Americans vs. Others	As a function of <u>REGIONS</u> Region 1 Region 2 Region 3 Region 4 Region 5 Region 6 Region 7 Region 8 Region 9 Region 10

The second set of questions identified in Table 3 concerned racial/ethnic differences in process. They were addressed with 2x2 chi-squares and non-parametric measures of association (e.g. Cramer's V).

The third set of questions in Table 3 concerned outcomes. They were addressed through a set of stepwise regressions where the dependent variable included (a) cost of services, (b) weekly earnings and (c) new weekly earnings (defined by the new earnings of clients after completing the program as compared to earnings upon program entry). In addition, we analyzed the outcome factors, such as type of closure, for their relation to cost of services using F-tests and Cramer's V. And finally, assessment of the research questions on outcome was supplemented by a series of discriminant function analyses conducted for weekly earnings at closure, work status at closure, and employment outcome at closure.

A few other supplemental analyses were conducted. For example, a set of agency regression analyses were performed to isolate specific locations where racial/ethnic membership was playing a significant role. Also, it was necessary to perform some summary analyses of the data given the numerous regression analyses performed. These summary analyses provided for better assessment of patterns in the data. This way, they were more easily seen and validated. In addition, these summary analyses were another means of addressing questions about patterns across the nations and differential patterns within regions. Also, there were several analyses conducted to assess racial/ethnic differences in process

activities and outcome indicators which were not addressed in any of the research questions (e.g., time in vocational rehabilitation, number of services, weekly earnings, closure status, and employment status).

Finally, the traditional measures of central tendency, measures of dispersion, frequencies, percentages, and charts were a major vehicle for displaying and interpreting the data. In addition, although we have relied heavily on the traditional .05 level of significance, we were mindful of practical significance in the assessment of meaningful and practical findings.

RESULTS

Summarized in this chapter are findings relevant to the specific research questions as well as other relevant relationships gleaned from the data. But first, it is informative to review some preliminary descriptive data which, in general, (a) confirmed the existence of a racial/ethnic difference in the program, and (b) provided a context from which other data were examined and interpreted.

Preliminary Findings

In the preliminary analysis, racial/ethnic differences were noted in the average cost for services, whether provided directly or purchased by agencies. For those rehabilitated in 1991, the average costs were:

White Americans	\$2662
Asian Americans	\$2454
Hispanic Americans	\$2283
African Americans	\$2044
American Indians	\$2011
<u>TOTAL SAMPLE</u>	<u>\$2516</u>

As shown in Table 4, many of the comparisons were made by grouping the cost of purchased services into four categories: (a) less than or equal to \$2000; (b) more than or equal to \$2000 to less than \$5000; (c) more than or equal to \$5000 and less than \$8000; and (d) more than \$8000. These represented natural breaks in the data and were based on an approach used in earlier analyses

TABLE 4

Distribution of Service Cost by Range of Cost and by Race

Cost Range	Race of Clients	Number of Clients	Percent of Racial Group	Total Expenditures	Percent of Expenditure for Race
<= \$2,000	White	91,832	70.51	\$60,731,266	72.64
	Black	25,025	19.21	13,780,138	16.49
	Indian	842	.64	587,517	.70
	Asian	1,423	1.09	847,245	1.01
	Hispanic	11,114	8.53	7,651,682	9.15
	Total	130,236	64.29	\$83,595,848	16.40
> \$2,000 & <= \$5,000	White	33,638	74.73	\$109,020,221	74.70
	Black	6,747	14.99	21,806,275	14.48
	Indian	273	.60	869,657	.59
	Asian	413	.91	1,358,241	.93
	Hispanic	3,937	8.74	12,746,471	8.74
	Total	45,008	22.22	\$145,800,865	28.60
> \$5,000 & <= \$8,000	White	11,284	76.41	\$70,416,455	76.46
	Black	1,947	13.18	12,096,733	13.13
	Indian	90	.60	557,525	.60
	Asian	136	.92	857,897	.93
	Hispanic	1,310	8.87	8,159,106	8.86
	Total	14,767	7.29	\$92,087,716	18.07
> \$8,000	White	9,999	79.52	\$150,532,258	79.97
	Black	1,660	13.20	24,629,867	13.07
	Indian	42	.33	495,619	.26
	Asian	126	1.00	2,085,445	1.10
	Hispanic	747	5.94	10,489,777	5.57
	Total	12,574	6.21	\$188,222,966	36.93

of these data.

An examination of Table 4 suggests that for the category purchased services costs of \$2000 or less, African Americans were overrepresented (19.21%) relative to their percentage in the total population (17.46%). Whereas, the proportion of White Americans was lower (70.51%) relative to their representation in the population (72.44%). For the category of service costs more than \$5000, the relative percentages are reversed, with Whites being disproportionately overrepresented (74.73) compared to their total population (72.44%) and Blacks (14.99%) being under-represented compared to their representation (17.41%) in the population. A similar pattern was noted for American Indians and for Hispanic Americans, but to a much lesser extent. But the representation of Asian Americans was more comparable to their population proportions; for example, in the first cost range (1.09%) compared to their population representation (1.04%). An examination of the remaining cost of services categories-->\$5,000 & <\$8,000 and >\$8000, show a similar pattern as noted for the <\$5,000 category; white clients were always represented relative to their population representation and the other groups were generally underrepresented relative to their population.

Tables 5 and 6 show a distribution of funds spent according to race/ethnicity in relation to the percentage of the total

TABLE 5

Distribution of Service cost by Region and by Race/Ethnicity

Region	Race of Clients	Number of Clients	Percent of Total	Total Expenditures	Percent of Total
Region 1	White	7,979	91.46	\$18,514,612	93.06
	Black	432	4.95	817,231	4.11
	Indian	11	0.13	20,010	0.10
	Asian	42	0.48	78,663	0.40
	Hispanic	260	2.98	463,941	2.33
	Total	8,724	100.00	\$19,894,457	100.00
Region 2	White	9,284	58.73	\$28,957,328	57.49
	Black	2,274	14.39	7,279,344	14.45
	Indian	23	0.15	64,844	0.13
	Asian	111	0.70	562,610	1.12
	Hispanic	4,115	26.03	13,505,339	26.81
	Total	15,807	100.00	\$50,369,465	100.00
Region 3	White	14,623	78.66	\$43,839,137	84.28
	Black	3,562	19.16	7,296,728	14.03
	Indian	24	0.13	23,239	0.04
	Asian	113	0.61	306,131	0.59
	Hispanic	269	1.45	549,400	1.06
	Total	18,591	100.00	\$52,014,635	100.00
Region 4	White	33,350	65.82	84,305,095	72.23
	Black	15,770	31.13	28,182,242	24.14
	Indian	217	0.43	329,595	0.28
	Asian	98	0.19	302,650	0.26
	Hispanic	1,230	2.43	3,602,483	3.09
	Total	50,665	100.00	\$116,722,065	100.00
Region 5	White	25,813	86.32	79,483,656	86.40
	Black	3,212	10.74	10,205,112	11.09
	Indian	150	0.50	324,597	0.35
	Asian	113	0.38	388,993	0.42
	Hispanic	1,230	2.43	3,602,483	3.09
	Total	29,905	100.00	\$92,000,197.00	100.00
Region 6	White	18,792	64.46	\$52,152,117	67.59
	Black	4,988	17.11	11,819,405	15.32
	Indian	247	0.85	588,647	0.76
	Asian	158	0.54	487,095	0.63
	Hispanic	4,969	17.04	12,116,452	15.70
	Total	29,154	100.00	\$77,163,716	100.00
Region 7	White	9,791	90.40	\$28,415,060	91.11
	Black	835	7.71	2,219,856	7.12
	Indian	48	0.44	99,165	0.32
	Asian	34	0.31	120,833	0.39
	Hispanic	123	1.14	333,895	1.07
	Total	10,831	100.00	\$31,188,809	88.47
Region 8	White	6,714	85.29	\$14,827,012	88.47
	Black	187	2.38	318,384	1.90
	Indian	144	1.83	340,240	2.03
	Asian	38	0.48	92,181	0.55
	Hispanic	789	10.02	1,181,614.00	7.05

TABLE 5 (cont'd.)

Region	Race of Clients	Number of Clients	Percent of Total	Total Expenditures	Percent of Total
	Total	7,872	100.00	\$16,759,431	100.00
Region 9	White	14,637	59.53	\$22,835,346	66.35
	Black	3,907	15.89	3,548,421	10.31
	Indian	221	0.90	325,880	0.95
	Asian	1,319	5.36	2,560,290	7.44
	Hispanic	4,504	18.32	5,144,359	14.95
	Total	24,588	100.00	\$34,414,296	100.00
Region 10	White	5,770	89.49	\$17,270,837	90.57
	Black	212	3.29	616,290	3.21
	Indian	162	2.51	392,101	2.04
	Asian	72	1.12	249,832	1.30
	Hispanic	232	3.60	551,714	2.88
	Total	6,488	100.00	\$19,180,324	

TABLE 6

**Disproportionality of Purchased Service Expenditures
By Region and Race/Ethnicity**

Race/Ethnicity					
Region	White	Black	Indian	Asian	Hispanic
1	+	-	-	-	-
2	-	+	-	+	+
3	+	-	-	-	-
4	+	-	-	+	+
5	+	+	-	+	+
6	+	-	-	+	-
7	+	-	-	+	-
8	+	-	+	+	-
9	+	-	+	+	-
10	+	-	-	+	-

LEGEND:

- + = Percent of money was proportionately larger than percent of client/representation in the population
- = Percent of money was proportionately smaller than percent of client/representation in the population

population in each of the ten regions. Ideally, one would expect the percentage of funds spent on a subgroup to be the same as their percentage representation in the total group. In nine of the 10 regions, Whites had proportionately more funds spent on them than their percentage of representation in the total population. The lone exception was Region 2. Similar results were seen for Asians, where there was an over representation of funds spent in relation to the total population in eight of the 10 regions. The exceptions were for Region 1 and Region 3.

Conversely, Blacks, Indians, and Hispanics had proportionately less money spent on them than their percentages in the total population would suggest. For two of these subgroups, this was true for eight of the 10 regions and for the Hispanics this was true for seven of the ten regions. The exceptions for Blacks were Region 2 and Region 5, for Indians Region 8 and Region 9, and for Hispanic Regions 2, 4 and 5. It should be pointed out, however, that in some instances the differences are minuscule.

Saturated Model

The saturated model consisted of utilizing the entire sample. This model was produced in order to identify significant variables which account for variance in the cost of services nationally. The dependent or criterion variable was the amount of money spent for purchased services. The list of independent variables included the previously defined demographics, disabilities (major and secondary), several context variables, and referral variables.

The total number of variables reaching significance for the saturated model was seventeen. The two most influential were time in VR entered on step one and number of purchased services, selected on step two (see Table 7).

The remaining fifteen significant variables, in order of their importance, were as follows:

- (1) Orthopedic, limbs (major disability five)
- (2) Blindness (major disability one)
- (3) Educational facility (referral one)
- (4) Major disability twelve (drug abuse)
- (5) Rehabilitation facility (referral two)
- (6) Psychotic conditions (major disability eleven)
- (7) Hearing impairment (major disability four)
- (8) White (race one)
- (9) Orthopedic, absence one upper, one lower (major disability ten)
- (10) Drug abuse (secondary disability twelve)
- (11) Deafness (secondary disability three)
- (12) Psychotic conditions (secondary disability eleven)
- (13) Orthopedic, lower (major disability eight)

Table 7
Multiple Regression Analysis
Saturated Model

Dependent Variable: **SERVCOST** (Amount of Purchased Services)

Independent Variable	SEB	BETA	T	SIG T
TIME-VR	2.20	.30	30.80	.000
NUMOFSER	26.47	.25	26.61	.000
MAJ 5	249.34	.07	7.19	.000
MAJ 1	189.58	.04	4.34	.000
REF 1	120.99	-.05	-4.90	.000
MAJ 12	149.87	-.04	-4.01	.000
REF 2	131.32	.05	5.08	.000
MAJ 11	121.29	-.03	-2.69	.007
MAJ 4	189.63	-.03	-3.45	.001
RACE 1	86.14	.04	3.83	.000
MAJ 10	327.85	.03	3.21	.001
SEC 12	136.09	-.05	-4.30	.000
SEC 3	525.34	.02	2.62	.009
SEC 11	104.73	-.03	-2.92	.004
MAJ 8	187.69	.02	2.56	.011
SEC 9	179.22	-.02	-2.42	.016
GENDER	83.59	.02	2.11	.035

Multiple R = .4560 F = 145.1184 p = .0000
 R^2 = .2080
Adjusted R^2 = .2066
N = 9412

(14) Other orthopedic (secondary disability nine)

(15) Gender (female)

The multiple correlation among all of the variables was $R = .46$ which means that all of the aforementioned variables combined accounted for 21 percent ($R^2 = .21$) of the variance in the service cost variable. It should be noted that some of the variables were negatively correlated. These included:

- (1) Educational facility (referral one)
- (2) Drug abuse (major disability twelve)
- (3) Psychotic conditions (major disability eleven)
- (4) Hearing impairment (major disability four)
- (5) Drug abuse (secondary disability twelve)
- (6) Psychotic conditions (secondary disability eleven)
- (7) Other orthopedic conditions (secondary disability nine)

The negative correlation means that lower cost was associated with the presence of the specific factor. For example, the greater the probability of an educational referral, the lower the cost of purchased services. Similarly, clients who were drug abusers were more likely to have less money spent on them.

Agency Analysis

Factors that influence cost of purchased services were examined at the agency level. The objective was to determine what role, if any, racial/ethnic membership played in the cost of services provided to clients and the relative importance of other factors in the equation.

Since the number of agencies was so large, and since there seemed to be some benefit to conducting the analyses by type of disabilities, the agency analyses were conducted only for those disabilities where racial/ethnic membership was found to be a significant predictor for cost of purchased services at the national level. Those disabilities included: Orthopedic limb; orthopedic lower; orthopedic upper; and mental retardation. Thus, for each of the identified disabilities, regressions were conducted for all agencies. The results have been summarized in the Tables found in Appendix A. The final multiple R's ranged from .43 to .75, with samples as small 46 and as large as 251. All of the equations, however, were statistically significant.

A review of the data revealed a consistent pattern for several agencies in that racial/ethnic membership was a significant predictor for two or more disabilities within the same agency. First, for agency #31, being an Asian was found to be a significant and positive predictor of cost of purchased services for two of the orthopedic disabilities. Although the number of services a client received and time in the program were more important predictors of cost of purchased services than racial/ethnic membership, being an Asian was definitely a significant and positive factor.

Second, for agency #3, the analysis showed that being a member of the White group and Hispanic group was a plus for cost of purchased services regarding specific orthopedic disabilities. There were four such significant equations, two for the White group and two for the Hispanic group. However, as with agency #31, other

factors, including time in the program, number of services, educational level and type of referral were also significant factors for Whites; but for Hispanics, the pattern was different. For both sets of analyses, being Hispanic was a more important predictor of cost of purchased services than number of services provided--one of the stronger predictors in all of the analyses noted in this project.

A third set of regressions revealed that in agency #32, being Black was a significant and positive predictor for two analyses involving orthopedic upper disability, while being White was a significant and positive predictor for the analyses of the mental retardation clients.

One final regression equation was found to have significant racial/ethnic predictors for agency #43 regarding the mental retardation clients. In this single analysis, being Asian was found to have a significant and negative influence on the amount of purchased services, but being Hispanic was found to have the opposite effect.

Taken together, these data clearly show that, for the most part, factors other than race/ethnicity memberships (usually time in the program and number of services), are more important predictors of how much money is spent on a client. However, in each of these cases, racial/ethnic membership made a significant contribution to the prediction, although the direction of the benefit varied depending on the disability and agency. Sometimes being White was a benefit, but other times being Asian, Hispanic or

African American was a benefit. Nevertheless, it is worth noting that for these identified agencies, 3, 31, 32, and 43, racial/ethnic membership was a significant factor and not for any of the other agencies examined in this manner.

Regional Models

Regression analyses were computed for each of the ten RSA regions. Thus the subsamples consisted of clients in each region for whom purchased services were obtained. For all ten analyses, the dependent variable was the amount of money spent for purchased services. The list of independent variables identified in the saturated analyses were the same ones used for the ten regional analyses. These results are reported in Appendix B, Tables B-1 to B-10.

In region one ($N = 397$), the variable selected on the first step was number of services, followed at the second and third step by time in VR and the psychotic major disability (major disability eleven). The total number of variables reaching significance was nine ($R = .67$; $R^2 = .45$) (see Table B-1 in the Appendix).

For region two ($N = 558$), five variables reached significance. These included: number of services, time in vocational rehabilitation, deafness as a secondary disability (secondary disability three), grade completed in school, and Asian membership (race four) ($R = .47$; $R^2 = .22$). (See Table B-2 in the Appendix.)

The findings for region three ($N = 734$) were similar to those noted for the first two in that once again the two most influential variables were number of services and time in VR. The other four

significant variables were, in order of their importance: orthopedic; absence one upper one lower as a major disability (major disability ten); other major orthopedic conditions (major disability nine); other conditions (major disability fourteen); and referral from private agencies (referral five). The standardized beta weight for referral from a private agency was negative, indicating an inverse relationship to cost of services ($R = .42$; $R^2 = .17$) (see Table B-3 in the Appendix).

The analysis for region four ($N = 2054$) again showed number of services and time in VR as the most significant predictors. These were followed in order by referral from a private agency (referral five), other secondary disability conditions (secondary disability fourteen), drug abuse as a major disability (major disability twelve), psychotic as a major disability (major disability eleven), and being White (race one) ($R = .45$; $R^2 = .20$). The relationships among psychotic as a major disability (major disability eleven), drug abuse as a major disability (major disability twelve), and the dependent variable were negative, indicating that clients with these disabilities tended to have less money spent on them compared to clients with other disabilities (see Table B-4 in the Appendix).

For the region five analysis ($N = 1168$), there were eight significant predictors. In order of influence these variables were time in VR; number of services; orthopedic, one upper as a secondary disability (secondary disability six); blindness as a secondary disability (secondary disability one); deafness as a major disability (major disability three); grade in school;

deafness as a secondary disability (secondary disability three); and drug abuse as a secondary disability (secondary disability twelve) ($R = .56$; $R^2 = .31$). Again, an inverse relationship was found between the drug abuse as a secondary disability (secondary disability twelve) and the cost of services (see Table B-5 in the Appendix).

The region six ($N = 1545$) analysis, produced ten significant variables. These were led by time in VR and number of services at steps one and two; followed in order by orthopedic, one upper as a major disability (major disability six); visual impairment as a major disability (major disability two); referral from a rehabilitation facility (referral two); other secondary orthopedic conditions (secondary disability nine); female; and African American (race two) ($R = .46$; $R^2 = .21$). Negative correlations were observed between other orthopedic conditions as a major disability (major disability number nine); and being African American (race two), and the service cost variable. Again, this indicated that clients with these characteristics tended to get less money spent on them (see Table B-6 in the Appendix).

The region seven ($N = 387$) analysis, produced five significant predictors. These included, in order of entry: Time in VR, blindness as a major disability (major disability one); number of services, Asian membership (race four), and African American membership (race two) ($R = .45$; $R^2 = .20$). Again, a significant negative relationship was found between being African American

(race two) and the cost of services. That is, membership in this group was associated with less money being spent.

The region eight ($N = 435$) analysis, produced a considerably higher Multiple R ($R = .61$; $R^2 = .37$). The variables in order of entry were: time in VR, number of services, grade in school, referral from a rehabilitation facility (referral two), and other visual impairment as a secondary disability (secondary disability two). A negative correlation was found between referral from a rehabilitation facility and the criterion variable, cost of purchased services (see Table B-8 in Appendix B).

In region nine ($N = 1694$) analysis, there were six significant predictors. In order of importance these were time in VR, number of services, Asian membership (race four), orthopedic lower as a secondary disability (secondary disability eight), orthopedic lower as a major disability (major disability eight) and other orthopedic condition as a major disability (major disability nine) ($R = .35$; $R^2 = .12$). And, again we found a negative relationship between other orthopedic condition as a major disability (major disability nine) and the cost of services.

Finally, the region ten ($N = 381$) analysis also produced six significant predictors. These included: time in VR, number of services, hearing impairment as a secondary disability (secondary disability four), hearing impairment as a major disability (major disability four), Native American membership (race three) and orthopedic, limb as a secondary disability (secondary disability five) ($R = .54$; $R^2 = .29$). An inverse relationship was observed

between being Native American Indian/Alaskan Native (race three) and the amount of money spent on purchased services. That is, less money tended to be spent on this group compared to other groups in region ten.

Race/Ethnicity Models

Research questions two and four sought to identify those social and theoretical variables that account for racial/ethnic cost variations. The importance of race/ethnicity in accounting for variance in cost of services was addressed in the fully saturated regression model and the regional regression models, discussed above as well as the race/ethnicity regression models represented in this section.

The race/ethnicity models employed five regression equations to examine relevant measures accounting for significant amounts of variance in the cost of services variable. Thus, the race/ethnicity models were achieved by conducting each analysis separately for each race/ethnicity. The dependent variable and the list of independent variables were the same for all analyses. These data are depicted in Appendix C, Tables C-1 to C-5.

The White model, or the race one model, (N = 6,130), produced eleven significant predictors. The two most influential measures were time spent in VR (entered on step one) and number of purchased services (entered on step two).

The remaining nine significant predictors, in order of their relative contribution to the model, were as follows:

- (1) Orthopedic, limbs (major disability five)

- (2) Blindness (Major disability one)
- (3) Orthopedic, absence 1 upper, 1 lower (major disability ten)
- (4) Rehabilitation facility (referral two)
- (5) Drug abuse (major disability twelve)
- (6) Educational facility (referral number one)
- (7) Psychotic conditions (major disability eleven)
- (8) Hearing impairment (major disability four)
- (9) Drug abuse (secondary disability number twelve)

The multiple correlation for the model was moderate ($R=.46$) and accounted for a relatively small proportion of the variance ($R^2 = .22$). Six of the measures had a positive correlation with money spent and five had a negative relationship, such that less money tended to be spent under those conditions (See Table C-1).

Specifically, negative relationships were observed between the cost of services variable and the following independent measures:

- (1) Drug abuse (major disability twelve)
- (2) Educational facility (referral one)
- (3) Psychotic conditions (major disability eleven)
- (4) Hearing impairment (major disability four)
- (5) Drug abuse (secondary disability number twelve)

The second regression model, which consisted of 1,819 African Americans, generated seven significant variables. The multiple correlation was $R=.47$ and these variables combined accounted for 22 percent ($R^2 = .22$) of the variance in the cost of services

variable. In order of influence, the significant predictors were as follows (see Table C-2):

- (1) Number of services provided
- (2) Time spent in VR
- (3) Drug abuse (secondary disability twelve)
- (4) Blindness (major disability one)
- (5) Rehabilitation facility (referral two)
- (6) Drug abuse (major disability twelve)
- (7) Educational facility (referral one)

Four of the above measures had a positive relationship to the cost of services variable and three had negative ones. The negatively correlated variables were as follows:

- (1) Drug abuse (secondary disability twelve)
- (2) Drug abuse (major disability twelve)
- (3) Educational facility (referral one)

The race three regression model, involving 562 Native Americans, produced five significant variables. The multiple correlation was $R=.49$ and these variables combined accounted for 24 percent ($R^2=.24$) of the variance. All of the variables had a positive impact and were selected into the equation in the following sequential order (Table C-3):

- (1) Time spent in VR
- (2) Number of services provided
- (3) Hearing impairment (secondary disability four)
- (4) Other conditions (secondary disability fourteen)
- (5) Orthopedic, lower (major disability eight)

Regression model number four was comprised of 785 Asians. A total of seven significant variables was generated. The multiple correlation was $R=.46$ and 21 percent ($R^2 = .21$) of the variance was explained. The significant predictors, in order of their relative contributions, were as follows (see Table C-4):

- (1) Time spent in VR
- (2) Deafness (secondary disability three)
- (3) Number of services provided
- (4) Orthopedic, lower (secondary disability eight)
- (5) Educational facility (referral one)
- (6) Mental retardation (major disability thirteen)
- (7) Orthopedic, limbs (major disability five)

Of the seven significant variables, referral to an educational facility was the only measure that was negatively related to cost.

The fifth regression model, which consisted of 708 Hispanics, produced five significant predictors. The multiple correlation was $R=.39$ and together these measures accounted for 15 percent ($R^2=.15$) of the variance. The significant variables were entered in the equation in the following sequence (see Table C-5):

- (1) Time spent in VR
- (2) Number of services provided
- (3) Other conditions (secondary disability fourteen)
- (4) Rehabilitation facility (referral two)
- (5) Visual impairment (major disability two)

Of these five predictors, visual impairment as a major disability was the only one which was negatively related to cost. As summarized below, taken together these equations produced comparable regression equations with the one exception of being Hispanic. The variables, time in program, and number of services were the most significant predictors for all racial/ethnic groups, except Whites, where having an orthopedic disability or being blind was most predictive of how much money was spent on White clients.

Racial/Ethnic Group	R	R ²
Whites	.46	21%
African Americans	.47	22%
Native Americans	.40	24%
Asian Americans	.46	21%
Hispanics	.39	15%

Type of Services. Also of interest, as expressed in research question seven, were possible racial/ethnic differences in type of services received. Table 8 summarizes this analysis. The findings indicate that by far the most prominent service was diagnosis and evaluation, which was provided to a range of 45% to 47% of all the clients across all five racial/ethnic groups. The second type of

TABLE 8

Percentage Distribution for Type of Service Provided According to Race/Ethnicity

Type of Service Provided	White		African American		Hispanic		Native American		Asian	
	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent	Freq.	Percent
Diagnosis & Evaluation	14,343	.45	3,524	.47	993	.47	1,372	.40	1,674	.45
Restoration	5,489	.17	1,212	.16	466	.13	466	.13	658	.17
College/University Training	2,436	.07	193	.02	136	.06	187	.05	211	.05
Business-Voc Training	2,442	.07	429	.05	145	.06	353	.10	305	.08
Adjustment Training	3,251	.10	1,059	.14	209	.09	402	.11	416	.11
On-The-Job Training	1,294	.04	350	.04	114	.05	191	.05	170	.04
Miscellaneous Training	2,374	.07	620	.08	156	.07	432	.12	275	.07
TOTAL	31,629	100%	7,387	100%	2,096	100%	3,403	100%	3709	100%

NOTE: Since clients can receive more than one type of service, numbering will exceed sample size.

service was restoration, with percentages in the range of .13% for Hispanic and Native Americans to .17% for Whites and Asians. The only other pattern worth noting was that adjustment training was slightly more prevalent (.14%) for African Americans than for any other racial/ethnic group. In addition, percentages for all other types of training were relatively small for all racial/ethnic groups.

Major Disability by Selected Cost Categories and Race/Ethnicity

Another analysis conducted to assess the racial/ethnic differences in process consisted of the distribution of clients by disability and race/ethnicity across the six cost categories for services. The data provide insight into money spent for clients of different racial/ethnic backgrounds with the same disability.

Focusing first on the blindness disability group, the data revealed a much higher proportion of Asians (17.4%) at the high cost level than any of the other race/ethnicity groups. This was followed by the African Americans with 12.5%. Native Americans had the lowest percentage (8.3%). Paradoxically, Asians constituted the highest percentage (65.2%) at the low cost level; followed by Native Americans (63.9%) and Whites (63.9%).

An examination of the deafness disability group showed the largest percentage at the high cost level was for the African American clients (14.6%). This was followed by the Asian group (13.3%) and the Whites (12.5%). Native Americans had the lowest percentage (4.2%) at the high cost level. The highest percentage at the low cost level was observed for Native Americans (70.8%).

The orthopedic categories in general showed mixed results. For example, large percentages at the highest cost level for all race/ethnicity groups were not the same at this level. The highest percentage was seen for Whites (18.6%) followed by identical figures for African Americans (14.3%) and Native Americans (14.3%). However, for orthopedic disability with one limb the White group was more represented at the highest cost level (10.36%) than all other groups except Hispanics (10.44%) and less represented at the lower cost level (56.15%) than all other racial/ethnic groups. Similar but less consistent patterns for the other racial ethnic groups (e.g., where one group was less represented in the lower cost levels, but not necessarily more represented in higher cost levels) were noted for the other orthopedic categories.

The pattern that emerged for the disabilities - psychiatric, drug abuse, mental retardation and other disabilities was similar. The White group was more likely than most other racial groups to be in the high cost level for psychotic (5.11%), drug abuse (3.19%), retardation (6.05%), and the other disabilities (6.35%). On the other hand, the White group was less represented than most other racial/ethnic groups in the low cost level of disabilities -- psychotic (64.0%), drug abuse (76.63%), retardation (56.38%), and other disabilities (61.73%). The American Indians had a similar pattern as Whites for drug abuse at the high cost end (2.42%) and at the low cost end (77.42%). Similarly, the Asians had a similar pattern as Whites for the retardation disability at the high cost level (8.36%) and at the low cost level (47.91%). However, for

none of these types of disabilities did we find that the African American group and the Hispanic group were more likely to be in the highest level as compared to other racial groups or less likely to be in the lowest cost level as compared to the other racial/ethnic groups.

Other Racial/Ethnic Differences. Other findings which concentrated on racial/ethnic differences in cost of services and time in VR were also formative. Significant differences in favor of Whites and Asians were noted for both variables. That is white and Asian clients had significantly more money spent on them and more time in VR compared to the other racial/ethnic groups.

Disability Regression Models

Multiple regression analyses were also employed for the purpose of examining significant variance in the cost of services variable, while controlling for the type of disability. Fourteen separate multiple regression models were generated which corresponded to each of the major disability types represented in the study. The dependent variable and the list of independent variables were the same as described for all analyses. These specific results are reported in Appendix D, Tables D-1 to D-14.

The regression model for blindness as a major disability regression model ($N = 707$) produced five significant variables. The multiple correlation was $R = .53$ and together these five predictors accounted for 29 percent ($R^2 = .29$) of the variance in the cost of services variable (see Table D-1). The ordering of the significant variables was as follows: (1) number of services

provided; (2) time spent in VR; (3) deafness (secondary disability three); (4) psychotic conditions (secondary disability number eleven); and (5) gender.

The regression model for visual impairment as a major disability (N = 563) generated two significant variables. In order of importance, number of services was selected on step one and time spent in VR was selected on step two. The multiple correlation was $R = .43$ and 18 percent ($R^2 = .18$) of the variance was accounted for using these two predictors.

The regression model for deafness as a major disability (N = 197) identified three significant predictors which were selected in the following sequential order: (1) time spent in VR; (2) number of services provided ; and (3) deafness as a secondary disability (secondary disability three). The multiple correlation among all of the measures was $R = .62$. These three predictors combined accounted for 39 percent ($R^2 = .39$) of the variability in the cost of services measure (see Table D-3).

The analysis for hearing impairment as a major disability (N = 425) produced three significant predictors. In order, these included: (1) time spent in VR; (2) number of services provided; and (3) hearing impairment as a secondary disability (secondary disability four). The multiple correlation was $R = .59$ and 35 percent ($R^2 = .35$) of the variance in the cost of services variable was accounted for using these three measures.

The analysis for orthopedic limbs as a major disability (N = 256) produced four significant predictors. Interestingly, the two most influential variables were blindness as a secondary disability (secondary disability one) and number of services provided; they were selected on the first and second steps, respectively. The third and fourth most significant measures, in order, were time spent in VR and referral by a rehabilitation facility (referral two) ($R = .64$; $R^2 = .42$) (see Table D-5).

The regression for orthopedic, one upper as a major disability regression model (N = 192) generated two significant variables. In order of importance, these were number of services provided, at step one and time spent in vocational rehabilitation. The multiple correlation was $R = .47$ and 22 percent ($R^2 = .22$) of the variance was accounted for using these two variables (see Table D-6).

The regression model for upper orthopedic as a major disability (N = 258) produced two significant predictors. Time spent in vocational rehabilitation was the most correlated and number of services was second. The multiple correlation was $R = .39$ and these two measures accounted for 15 percent ($R^2 = .15$) of the variance in the cost of services variable.

The model for lower orthopedic as a major disability regression model (N = 483) generated three significant variables. In order of importance these were time spent in VR; number of services provided; and referral from a rehabilitation facility. The multiple correlation for all of the variables was $R = .45$.

Together, these three significant predictors accounted for 20 percent ($R^2 = .20$) of the variance (see Table D-8).

The analysis for other orthopedic conditions as a major disability ($N = 803$) revealed two significant predictors in the model. In order of importance these were: time spent in vocational rehabilitation and number of services provided. The multiple correlation was $R = .42$ and 18 percent ($R^2 = .18$) of the variance in cost of services was accounted for using these two measures.

The model for absence of one upper and one lower as a major disability ($N = 155$) produced two significant predictors. Time spent in vocational rehabilitation continued to be the best predictor and number of services provided was second best. The correlation among all of the variables was only $R = .27$ and only seven percent ($R^2 = .07$) of the variance was accounted for using these two measures (see Table D-10).

Using psychotic condition as a major disability regression model ($N = 1921$) generated six significant predictors. Number of services provided came in first as the best predictor; time spent in VR was second in order; referral from other public facility (referral four) was third; mental retardation (secondary disability thirteen) was fourth; orthopedic, one upper as a secondary disability was fifth; and referral from a rehabilitation facility was last. The multiple correlation was $R = .47$. Together these six variables accounted for 22 percent ($R^2 = .22$) of the variance in the cost of services. Also of importance to note was the negative relationship found for at least one of the variables

(other public facility, referral number four) was negatively correlated with the criterion indicating an inverse relationship between these two measures).

The analysis for drug abuse as a major disability (major disability twelve) regression model ($N = 1810$) generated five significant variables. Time spent in vocational rehabilitation and number of services provided continued to be the first and second best predictors, respectively. The remaining three significant variables were entered in the following order: White membership (race one); other secondary conditions (secondary disability fourteen); and orthopedic limbs as a secondary disability (secondary disability five). The multiple correlation was $R = .57$. Together, these five predictors accounted for 32 percent ($R^2 = .32$) of the variance. And again the negative correlations were of interest. The relationship between the service cost measure and orthopedic limbs as a secondary disability (secondary disability five) was negative, indicating that this disability was associated with lower cost.

The analysis for mental retardation as a major disability ($N = 1332$) produced five significant predictors. For this model, number of services provided came in first as the best predictor and time spent in vocational rehabilitation was second best. Variables with lesser relevance were selected in the following order: referral number one (educational facility); White membership; and Asian membership. The correlation among all of the variables was

$R = .37$. The five significant variables combined accounted for only 14 percent ($R^2 = .14$) of the variance. The negative correlation here was between the cost of services variable and referral number one. Again, this indicates lower cost being associated with educational referrals.

The last disability model included 1,956 cases and represented all other conditions not previously examined. Six significant predictors were generated. Time spent in VR and number of services provided continued to be the first and second most influential predictors. In order of relative contribution, the remaining four variables were selected in the following sequence: referral to an educational facility; referral to a private source; White membership; and secondary disability number eleven, psychotic conditions. The correlations among the dependent measure and referral number one (educational facility) and psychotic conditions (secondary disability eleven) were negative. Again, this indicates that lower cost was associated with these variables. The model's final correlation was $R = .37$ and the six predictors combined accounted for only 14 percent ($R^2 = .14$) of the variance in the cost of services.

Proportional Distribution of Significant Predictors

Research question six examined dominant factors accounting for variance in cost of services that vary by nation and regions. This question was investigated by means of the regional regression models and the fully saturated models across disabilities within regions.

The results of regression models were summarized by disability groups within regions. These data are presented in Tables 9 and 10 and provide some very cogent insight into the data. The findings from the models were summarized in such a fashion that the patterns across regions and disabilities were more apparent. That is, the patterns are presented across regions, regardless of disabilities (Table 9), and then again, regardless of regions (Table 10), across disabilities. Table 11 then adds additional information about the order of the variables for the analyses.

Regional Patterns. Table 9 shows the number of variables that were significant variables for a particular region along the bottom row. The regions included in the model are listed across the top. The values given in the table are percentages representing the proportion of the time that a corresponding variable was significant among all the regressions run for a specific region. For example, in region one, the number of services was found to be significant 34.62 percent of the time for all runs across all disabilities. Time in VR was significant 30.77 percent of the time. Values shown for other regions are interpreted in essentially the same way. In addition, the last column on the right side shows the average (arithmetic mean) for variables listed on the far left. These computations afforded a more sensitive measure of the influence and importance of these variables.

It can be seen in Table 9 that the variables having the greatest influence across all regions were number of services and time in vocational rehabilitation. Two additional kinds of

TABLE 9

Regional Proportional Distribution of Significant Predictors
of Cost of Services

Variables	Regions										Avg. %
	1	2	3	4	5	6	7	8	9	10	
Numofser	34.62	26.32	38.71	30.00	33.33	26.83	25.81	20.69	22.86	22.73	28.2
Time VR	30.77	26.32	35.48	20.00	30.77	26.83	29.03	34.48	31.43	28.57	29.3
Gender		02.63		02.50	05.13	02.44	09.68	06.90	02.96	13.64	05.7
White Am.		02.63	03.23	02.50		02.44	03.23	06.90			03.5
Asian/Pacific		05.26	03.23	02.50		04.88	03.23		05.70	04.55	04.2
African Am.					02.56		*03.23				02.9
American Ind.		02.63		02.50		02.44			02.86	*04.55	03.0
Hispanic Am.		05.26		05.00			09.68	06.90			06.7
Blind (Sec 1)			03.23								03.2
Other Cond.sec	03.85	02.63									03.2
Ortho Lower.sec		02.63				02.44					02.5
Ortho Other.sec		02.63							02.86		02.7
Drug Abuse Sec							03.23		02.86		03.0

(Table 9 Continues)

* Indicates negative correlation

TABLE 9 (Continued)

Variables	Regions										Avg. %
	1	2	3	4	5	6	7	8	9	10	
Hearing Impairment Sec		02.63		02.50		04.88		03.45			03.4
Psychotic sec			03.23	02.50					05.71		03.8
Edctn. Referral	15.38		06.45	07.50	02.56	07.32	06.45	03.45	05.71		06.9
Rehab. Fcty	03.85	07.89	06.45	07.50	05.13	09.76	06.45	06.90	05.71	04.50	06.4
Public Fcty	03.85						03.23		02.86		03.3
Other Pub. Fcty		02.63		05.00							03.8
Private Referral	03.85	02.63	03.23				03.23		02.86		03.1
Grade	03.85	05.26		02.50	07.69		03.23	03.45			04.3
Visual Impairment Sec				02.50				03.45			03.0
Absence Sec					02.56						02.6
Ortho Other sec					02.56				02.86	04.56	03.3
Deaf Sec						02.44					02.4
Total # of Significant variables in each region	26	38	31	40	39	41	31	29	35	22	

TABLE 10

Proportional Distribution of Significant Predictors of
Cost Services (Across Regions) Major Disabilities

MAJOR DISABILITIES														
Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	Avg. %
Nonuser	26.92	26.92	26.92	30.77	23.08	27.27	46.67	22.22	25.93	20.00	33.33	29.41	33.3	28.67
Time VR	26.92	38.46	30.77	26.92	28.57	36.36	33.33	29.63	33.33	26.67	33.33	29.41	16.8	30.03
Gender	11.53			3.45	3.570	9.090		7.410	7.410	6.670	6.670			6.96
White Americans		3.85	3.85					7.410	3.700			2.940	3.33	4.18
African Americans	3.84											5.880	3.33	4.35
American Indian			7.690					3.700					6.670	6.02
Asian/Pacific	3.84	3.85	3.85			4.550		3.700	3.700	6.670	3.330	2.940	3.33	3.98
Hispanic		3.85		3.85	3.57	4.550			3.700	6.670	3.330	2.940	3.33	3.98
Psychotic (Sec)	3.84												3.33	3.68
Visual Impair (Sec)				3.85										3.85
Drug Abuse (Sec)		3.85										2.940		3.40
Alcohol (Sec)					3.57									3.57
Ortho Other (Sec)			3.85					3.700						3.78
Ortho Upper (Sec)				3.85	3.57							2.940		3.45
Hearing Impair (Sec)			3.850	3.850	3.570				3.700	6.670				4.32
Blind (Sec)							6.670							6.67
Private (Referral)	3.840					9.090						2.940	3.330	4.80
Education (Referral)	7.690	7.690	15.380		7.140	9.090	6.670		3.700		3.330		5.880	7.39
Other Public (Referral)				3.850							3.330	2.940	5.880	4.00
Rehab Facility (Referral)	3.840	3.850		15.38	3.57	13.640	6.670	14.810	3.700	13.33	10.000	2.940		8.34
Public Facility (Referral)		3.850			3.57				3.700					3.71
Grade	7.690	3.850		3.85				3.700	7.410	6.670	3.330			5.21
Ortho 1 Up (Sec)					3.57									3.57
Other Conditions (Sec)								3.700				2.940		3.32
Ortho Lower (Sec)										6.670			3.330	5.00
Deaf (Sec)													3.330	3.33
Total	26	26	26	26	26	27	18	27	27	18	30	34	30	

observations can be made regarding the content of these tables. The first of these is the number of regions in which a variable was influential. The second is the numerical value of the percentage itself. For example, gender was a significant predictor in eight of the ten regions. Being a member of a particular race was influential across several regions but the advantage associated with particular races varied from region to region.

TABLE 11

Summary of Significant Step Entry for Regression Equations

Predictor	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7	Step 8
No. of Serv.	32.2%	39.2%	10.7%					
Time in VR	56.5%	18.6%	8.9%	4.7%	22.2%			
Ref 2	3.2%	8.8%	12.5%	14.2%	11.1%			
Ref 1	2.4%	5.8%	10.7%	4.7%				
Gender	1.6%	6.8%	5.3%					
Sec 4	.8%			4.7%				
Sec 10				4.7%				
Race 4		2.9%	7.1%	4.7%	22.2%			
Race 5		4.9%	1.7%					
Race 1		.9%	5.3%	4.7%				50%
Race 3		1.9%	3.5%					
Sec 6					11.1%			
Sec 11		.9%		4.7%				
Sec 8		.9%						
Ref 5		1.9%	5.3%					

TABLE 11 (cont'd.)

Predictor	Step 1	Step 2	Step 3	Step 4	Step 5	Step 6	Step 7
Ref 4		2.9%	1.7%				
Grade		2.9%	7.1%	9.5%		50%	
Race 2			3.5%	14.2%			
Sec 12			1.7%	9.5%	11.1%		
Sec 9			1.7%	4.7%			
Sec 7			3.5%		11.1%		
Sec 4			3.5%			50%	50%
Ref 1			10.7%				
Ref 5			5.3%				
Sec 2			1.7%		11.1%		
Sec 1			1.7%				
Sec 14			1.7%				
Ref 3				14.2%			
Ref 4				4.7%			

Being White, for example, was advantageous in six of the ten regions. Being Asian was advantageous in seven out of ten regions.

Interestingly, African Americans had relatively more money spent on them in only one region (region five). Hispanics and Native Americans had relatively more money spent on them in four out of ten regions. It is particularly noteworthy that African Americans and Native Americans were the only two subgroups experiencing a negative influence. This means that their correlation with purchased services was negative rather than positive. For African Americans this occurred in region seven and for native Americans in region ten.

Gender, that is being male or female, had a significant and positive influence favoring females in eight of the ten regions and especially in Regions 7, 8 and 10.

Disability Patterns. In Table 10, a second application of the model summarization is represented for the assessment of disabilities across regions. In this application, observations were summarized across regions with the type of major disability considered as the basis for sample selection. Fourteen models corresponding to each of the major disability types were assembled using samples of clients from all ten regions.

The results for disabilities in Table 10 were similar to those outlined in Table 9 for the regional patterns, regardless of disabilities. The two most influential variables were again number of services and time in VR. But being female was somewhat elevated in potency, especially in Region 1.

Race/ethnicity was again especially interesting as an influence. Being White was a significantly positive influence for six of the disability groupings. Being African American was a positive influence for only three. The same was true for Native Americans, although their average percentage was higher than for either Whites or African Americans. Being Asian was a positive influence for ten of the major disability categories. Exceptions were observed for disability groups with hearing and orthopedic upper impairment. In this group of analyses, greater prominence was also seen for type of referral, especially referral from an educational facility and referral from a rehabilitational facility.

Order of Significance. Although Tables 9 and 10 represent a summary of significant step entries for regression equations across regions and disabilities, the summary does not address the relative importance of the factors. But, as shown in Table 11, highlights for the order of variable entry show some interesting patterns.

First, the most significant predictor of cost of services (across the regions and disabilities) was the length of time in the rehabilitation program. Time in VR comprised 56.5% of step one entries and 18.6% of step two entries. The second most salient predictor of cost of services was number of services provided. This measure constituted 32.5% of the step one entries and 32% of the step two entries. It should be noted that race/ethnicity was not found to be among the most salient (step one) predictors of cost of services.

However, race/ethnicity was often selected as the second (step two) most salient predictor--about 10.6% of the time--if type of race/ethnic group is not considered. For example, Asians (race four) comprised 2.9% of the entries; Hispanics (race five) 4.9%; Whites (race one) 0.9%; and Native Americans (race three) 1.9%. Likewise, race/ethnicity was often selected as the third (step three) most salient predictor about 21% of the time. Asians constituted 7.1%; Hispanics 1.7%; Whites 5.3%; Native Americans 3.5%; and African Americans 3.5%. Interestingly, race/ethnicity was selected as the fourth (step four) best predictor approximately 23.6% of the time (Asian 4.7%; Whites 4.7 percent; Whites 4.7%; and African Americans 14.2%). Asians were the only group selected on step five about 22.2% of the time and Whites were selected on step eight about 50% of the time.

Three other factors which were frequently selected on the second step (step two) or were the second best predictor included referral from a rehabilitation facility (8.8 %), female gender (6.8%), and referral from an educational facility (5.8%). The secondary disabilities were selected at the third step about 15.5% of the time. These included blindness (1.7%), visual impairment (1.7%), hearing impairment (3.5%), upper orthopedics (3.5%), and other orthopedics (1.7%). Hearing impairment as a secondary disability was selected on step six 50% of the time and step seven 50% of the time. Other factors often selected on Step 4 or higher occurred where the total number of entries was generally lower and the incremental R^2 was usually very small.

Factors Influencing Whether Services were Purchased

Research question eight investigated the extent to which there were differences among ethnic groups in whether services were purchased or not. The Cramer's V statistical procedure was employed to address this question. This statistic is a measure of the strength of association. The relationships were almost always significant (that is, related to whether specific services were in house or purchased outside); but such relationships were always very small in their magnitude.

Specifically, Table 12 shows the strength of association between race/ethnicity and source of service for various service sample groups. The size of these coefficients ranged from a low of .04 for the restoration sample up to a slightly higher coefficient of .16 for college and university training. Once again, most of the coefficients were extremely small. Sample groups with the highest coefficients were college and university training ($V = .16$), business and vocational training ($V = .12$), and job placement ($V = .10$).

An exploratory analysis revealed that the association between new weekly earnings and race was .06. The association between new weekly earnings and type of disability was .14. These values were interpreted as being so small as to be practically meaningless.

In addition, an examination of the association between source of service and the compute variable "new weekly earnings" was performed. The statistical technique used for this analysis was also Cramer's V. Table 13 shows the strength of association

TABLE 12

**Cramer's V for Association between Race/Ethnicity and
Source of Service Provided (Purchased vs. In-house) for
Selected Services Sample Groups**

Service Sample Groups	Cramer's V
Diagnostic & Evaluation	.05
Restoration	.04
College & University	.16
Business Vocational Training	.12
Adjustment Training	.09
On the Job Training	.05
Miscellaneous Training	.08
Counseling & Guidance	.07
Job Referrals	.11
Job Placement	.10
Transportation	.08
Maintenance	.08
Other Services	.06

TABLE 13

Cramer's V for Association between New Weekly Earnings
and Source of Service Provided (Purchased vs. In-house) for
Selected Services Sample Groups

Service Sample Group	Cramer's V
Diagnostic & Evaluation	.06
Restoration	.11
College & University	.11
Business Vocational Training	.06
Adjustment Training	.25
On the Job Training	.19
Miscellaneous Training	.13
Counseling & Guidance	.05
Job Referrals	.12
Job Placement	.13
Transportation	.03
Maintenance	.06
Other Services	.03

between new weekly earnings and source of service for various service sample groups. The size of the coefficients ranged from a low of .03 up to a high of .25. Most of the coefficients were so extremely small as to be considered as inconsequential. The sample groups with coefficients to which some meaning might be attached were adjustment training ($V = .25$), and on the job training ($V = .19$). These data suggest that adjustment training, and job training were associated with better new weekly earnings.

Outcomes Indicators

The outcome component of the study focused on the end result of the rehabilitation process. For purposes of this discussion, end results are referred to as "outcomes," in which the objective of the analyses was to explore the effectiveness of selected variables for predicting how the client would be situated as a result of the money spent and the services received. In addition, some racial/ethnic differences were examined. Research questions nine through thirteen explored the effectiveness of selected variables in predicting client outcomes at closure. Regression analysis and discriminant analysis statistical techniques were used to investigate these questions. Outcomes variables selected for the study were: (1) weekly earnings at the end of the rehabilitation process; (2) the difference between amount of earnings at the beginning of rehabilitation and amount at the end of rehabilitation; (3) work status at closure; and (4) employment status at closure.

Predictor variables used to address the outcomes relationship were: (1) number of services; (2) time in VR; (3) service cost; (4) sources of support at closure; (5) work status at closure; and (6) employment status at closure. Service cost as indicated earlier was the variable name for the amount of money spent for purchased services.

Work Closure

Another outcome analysis was work status. There were six closure categories of work status including: (1) competitive labor market; (2) sheltered workshop; (3) self-employed; (4) business enterprise; (5) homemaker; and (6) unpaid family worker. A discriminant analysis was employed to determine at closure how effective various factors were in predicting membership in the six categories. Significant predictors in order of importance were: (1) time in VR; (2) number of services; (3) having a private relief agency as a source of support at closure; (4) weekly income at the beginning of rehabilitation; and (5) service cost. They loaded on five functions, of which only one emerged with any substantial value. The canonical correlation observed for that function was .37. The variables that primarily composed function one was weekly income at the beginning of the program ($r = -.71$) which had a negative impact, and private relief agency as a source of support, which had a positive influence ($r = .81$). The work status categories with the highest group means (centroids) on function one were sheltered workshop (mean=1.70) and homemakers (mean=1.63). The work status category with the lowest group mean on function one

was the competitive labor market (mean= $-.10$). Thus, considering function one as "economically disadvantaged", the finding suggests that this characteristic is more indicative of clients who had jobs as sheltered workshop workers and homemakers and less indicative of clients leaving the program who were in the competitive labor market. The percent of cases correctly classified with this analysis was 60.6%, which was considered an acceptable level of accuracy of prediction.

An analysis of variance was also conducted to determine the relationship between work status categories and cost of services received in order to address research question ten. The results revealed significant differences among means for cost of services by the six categories of work status, but the actual effect size as measured by the coefficient eta was negligible, .06.

Employed vs. Not Employed

At closure, the data indicated that substantially more clients were unemployed (59.4%) than were employed (40.6%) and differences in status was related to the client's race/ethnicity. For example, 33% more Hispanics were unemployed than were employed and among Native Americans 25% more clients' were unemployed than employed. Not surprisingly, the groups faring better in this regard were White and Asian clients where only 19% more of those clients were unemployed than employed. A surprising result was the ratio of employed and unemployed African American clients at closure. Only 11% more of those clients were unemployed than employed. Thus, it appeared that African American clients were the most resilient

clients of all. Also worth noting is that Whites ($M=11.91$) and Asians ($M=11.97$) and African Americans ($M=11.68$) had the highest grade completed compared to Hispanics ($M=10.72$) and Native Americans ($M=11.59$). These results suggest that employee status at closure by race/ethnicity was related to the educational level of the client. Difference in employment status was then subjected to a discriminant analysis to determine how efficiently the variables predicted being in one group or another.

Using the same predictor variables as explained with the weekly earnings analysis, it was determined that the most influential predictor was the number of services the client received ($r = .72$). This was followed by private relief as a source of support at closure ($r = -.51$), time in VR ($r = -.29$), and cost of services ($r = .26$). These variables loaded on the one function produced, which had a canonical correlation of .26 with the employment status variable. Clients who were employed at closure had a mean or group centroid of .29 on the function and clients who were not employed at closure had a mean of $-.25$. Thus, clients who were employed were more likely to have considerably more expensive services in a shorter period of time than clients who were not employed. Moreover, clients who were employed were less likely to have private relief as a source of support at closure when compared to clients who were not employed. In the final analysis, the equation could correctly classify 61.8% of the cases for the employment status variable. This level of accuracy was

significantly greater than would be expected on the basis of chance alone.

An analysis of variance was also conducted to determine the relationship between employment status and the cost of services received. Although there were significant differences among the means for cost of services, such that employed clients had more money spent on them, the actual effect size as measured by the coefficient eta was only, .10.

New Weekly Earnings at Closure

Using multiple regression, a number of these variables were found to be significant predictors of the earnings differential between what the clients were making at the beginning of rehabilitation and what they were making at the end of rehabilitation. The most influential of these was grade in school which had a positive effect. Grade in school was followed by whether the client was receiving SSDI benefits and public assistance which were negatively correlated with the dependent variable. Other variables included in the equation, but which had a lesser influence were work status, psychotic conditions as a major disability (major disability eleven), source of support, and gender. At the last step the multiple R was .42 with an R^2 of .18.

Important to the understanding of these findings were the ANOVA findings that Whites ($M=11.91$) and Asians ($M=11.97$) had the highest grade completed and Hispanics ($M=10.72$) had the lowest. Thus, the other findings that Whites ($M=244.63$) and Asians

($M=239.22$) had more weekly earnings at closure than Hispanics ($M=209.84$) was not surprising. But what was interesting was that Native Americans had the best new weekly earnings of all groups and the second best weekly earnings ($M=236.55$).

Weekly Earnings at Closure

Using weekly earnings at closure as an outcome variable, a multiple regression was employed to assess the influence of various factors. A total of sixteen variables entered into the prediction equation, but most of the variance in weekly earnings was attributable to work status two (sheltered workshop) and source of support three (Public Assistance (Federal)), seven (SSDI Benefits), and one (Family & Friends). Working in a sheltered workshop was negatively correlated with weekly earnings and having any source of support had positive influences.

The final multiple correlation for this analysis was .37, and it was significant. And as indicated in the previous section, Whites, Asians and Native Americans earned the most at closure, while Hispanics and African Americans earned the least. This latter finding is particularly interesting in light of the data showing African Americans with a better employment ratio at closure than all other groups.

DISCUSSION

This study was an investigation into the individual and program related characteristics of clients whose cases were closed by the state rehabilitation agencies in FY 1991. The primary purpose was to examine apparent purchased cost variations in the delivery of services among various racial/ethnic groups. This study also examined the effect of other factors in influencing cost of purchased services. Other major foci of the study examined process related factors and outcome indicators. In all cases, however, a primary concern was the relative importance of race/ethnicity. This section of the report summarizes the findings, and discusses them in light of the research question.

Determining Cost of Services

Consistent with the research question, several regression analyses were conducted in an attempt to determine what predicted how much money was spent on a client. Of particular concern, was the importance of the race/ethnicity variable. In general, these models revealed a consistent pattern for the nation, as a whole, for different regions of the country, different disabilities, and for different racial/ethnic groups. The most important predictors of cost of services were time in the VR program and the number of services received. The longer a client was in the program and the more services a client had, the higher the cost of services. However, the results of these models also consistently showed that the significant variance in cost of services noted in this study by

these variables was small compared to what was accounted for. The relevant research questions were:

Research Question One: What are the significant variables that explain the variance in cost of services?

Research Question Three: What is the order of importance among the variables that account for the cost of services?

Research Question Five: How much of the variance in the cost of services is accounted for by the specific variable of educational level, type of disability, age, sex, race/ethnicity, etc., across regions?

Research Question Six: Are there differences among the dominant factors that account for the variance in cost of services nationally and the cost of services for each region?

The results revealed that at the national level, time spent in VR and the number of services accounted for 19% of the variance in cost of services. When the remaining fifteen significant variables were entered into the equation, only 21% of the variance was explained. This two percent increase in the observed variance indicates that the contributions of the remaining fifteen variables were very small.

The order of importance of the significant variables in the saturated model was as follows:

- *(1) Time spent in vocational rehabilitation
- *(2) Number of services provided
- *(3) Orthopedic, limbs as a major disability
- *(4) Blindness as a major disability
- (5) Referral to an educational facility
- (6) Drug abuse as a major disability
- *(7) Referral to a rehabilitational facility

- (8) Psychotic or psychiatric condition as a major disability
- (9) Hearing impairment as a major disability
- *(10) White race
- *(11) Orthopedic, absence one upper and one lower as a major disability
- (12) Drug abuse as a secondary disability
- *(13) Deafness as a secondary disability
- (14) Psychotic or psychiatric condition as a secondary disability
- *(15) Orthopedic, lower as a major disability
- (16) Other orthopedic conditions as a secondary disability
- *(17) Gender (female)

NOTE: * = positively correlated items.

Ten of the significant variables were positively correlated with cost of services while the other seven had a negative relationship with cost. The positively related items are indicated by asterisks. Taken together, these findings show that although time in VR and number of services are the best predictors of cost, there is a clear pattern of certain types of disabilities being more expensive to serve than others. For example, most of the physical disabilities (e.g., orthopedic conditions, blindness, and deafness as secondary disabilities) tended to be associated with higher cost. And, many of the mental health or more "objective"

disabilities tended to be associated with lower cost (e.g., drug abuse, and psychotic disorders).

As related to the impact of race and gender, being White and female were significant factors in cost, but their contributions to the model were small. Nevertheless, the racial/ethnic findings were consistent with the preliminary descriptive summary of data, which showed that White clients tended to be more underrepresented in the lowest of the six cost categories, but overrepresented in the remaining five, while the opposite was generally true of the other racial/ethnic groups. They tended to be underrepresented in the higher cost of services categories and overrepresented in the lowest cost category. Taken together, these data suggest that being White represents a small but significant advantage to clients in the VR program.

The regional regression models confirmed the findings at the national level and in some regions accounted for significantly more of the variance in cost. The variables under study were better predictors in regions one, five, and eight accounting respectively for 45%, 31%, and 37% of the variance in the cost of services. The predictor variables were less effective in predicting cost in regions three, four, seven, and nine accounting respectively for only 17%, 20%, 20%, and 12% of the observed variance. Specifically, the results revealed that time spent in vocational rehabilitation and number of services provided were either the first or second most important predictors in nine of the ten regions. In region seven, although number of services was not

selected until step three, the relative contribution was the same as that of blindness as a major disability (major disability one) which was selected on the second step. It was particularly interesting that number of services was entered on the first step for the first four regions but at the second step for the remaining six (from region five through ten).

With regard to the racial/ethnicity factor, the findings for the regional analyses were more revealing. Race was a significant influence in five of the ten regions; these regions were two, four, six, seven, and ten. Specific races with particular influence were Asian (Region two and seven), White (Region four), African American (Region six and seven) and Native American (Region ten). It is noteworthy that being African Americans and Native Americans correlated negatively with money spent, while being Asians and Whites was positively correlated with cost. Thus, the findings suggest a tendency for more money to be spent on Asians and Whites than other groups--African Americans and Native Americans. These findings shed additional light on the earlier descriptive summary data noted during the preliminary analyses. Those data showed that in most regions, Asian clients and especially White clients had disproportionately more money spent on them, than would be expected given their representation in the client population. The same pattern was less likely to occur for the other racial groups, and in fact, the opposite was more likely. That is, for African American, Native Americans and Hispanics, in most regions, there was disproportionately less money spent than would be

expected given their regional representation. Taken together, these data suggest that one's race/ethnic group is a significant factor in how much money is spent on services, with some races being in better positions than the others.

However, these data also show that the overall impact of race is relatively small and the benefits of being White or Asian does not exist in all regions of the country.

The regional analyses were particularly telling because they provided the best opportunity to control for systematic variance in cost of services. That is, by examining factors influencing cost within a disability, the "time variance" associated with other variables had a better chance of presenting itself. Similarly, by keeping constant, the disability within region, variance due to locale could be partialled out. In general, the findings were consistent with the other analyses.

The categories that tended to incur greater expenditures included the following:

- Orthopedic (absence one upper and one lower)
and other orthopedic
- Deafness
- Orthopedic, one upper and visual impairment
- Lower orthopedic and other orthopedic
- Hearing impairment

The secondary disabilities that also exerted a significant and positive influence on the cost of services were:

- Deafness
- Orthopedic, one upper, deafness, blindness
- Visual impairment
- Lower orthopedic
- Hearing impairment and orthopedic, limbs

Several of the disabilities that were negatively correlated with the cost of services were:

- Psychotic and drug abuse as major disabilities
- Drug abuse as a secondary disability
- Other orthopedic as a major disability

Thus, the findings from the regional models and the disability models reflect basic consistencies with the national model. Time spent in the rehabilitation program and number of services provided were most closely related to the cost of services, but other factors such as race/ethnicity did play a small but significant role. The proportional distribution of significant predictors across regions and disabilities helped to summarize the pattern of results. The most significant predictor of cost of services was the length of time in the rehabilitation program. The second most salient predictor was number of services provided. However, race/ethnicity was the second most salient predictor approximately 10.6% of the time, the third most salient predictor about 21% of the time and the fourth best predictor about 23.6% of the time.

The Importance of Race/Ethnicity in Determining Cost

Research questions two and four were addressed in the fully saturated regression model, the race/ethnicity regression models, and the disability regression models.

Research Question Two: Are there combinations of theoretical or social variables that account for the cost disparity between Whites and individuals of minority status?

Research Question Four: How much of the variance in cost of services is accounted for by race/ethnicity?

Findings from the fully saturated regression model, as related to racial/ethnic disparities, were discussed in the previous section of the report. Four of the five racial/ethnic regression models were equally effective in explaining the observed variance in the cost of services. The exception was the Hispanics model. The proportion of the variance that was explained in each of the models was as follows: White model (20%); African American model (22%); American Indian/Alaskan Natives model (24%); Asian/Pacific Islanders model (21%); Hispanics model (15%). Again, this means that the predictor variables employed in the models were only marginally effective in explaining the variance. In all five of the models, the two most influential variables continued to be time spent in the rehabilitation program (VR) and number of services provided. Among Whites, Native Americans, and Hispanics, time in the rehabilitation program was the best predictor of cost of services and number of services provided was the second best predictor. For African Americans, the order of importance was reversed and the number of services provided was the best predictor

and time spent in VR was second best. In the Asian model, time spent in VR was the best predictor, deafness as a secondary disability was second best, and the number of services provided was third.

For both Whites and African Americans, drug abuse as major and/or secondary disabilities was associated with lower cost. Additionally, the major disabilities of psychotic conditions and hearing impairment had a negative relation to cost, but only for Whites. The major disability of visual impairment had a negative correlation with cost, but only among Hispanics.

In reference to disability types, the high cost conditions for Whites included orthopedic (limbs, absence one upper and one lower) and blindness as major disabilities. Among African Americans, the only high cost condition was blindness as a major disability. For Native Americans, the high cost conditions included hearing impairment and other conditions as secondary disabilities, and orthopedic (lower) as a major disability. Interestingly, among the Asian group, deafness as a secondary disability had a greater influence on cost than the number of services provided. The other influential measures for this group included orthopedic (lower) as a secondary disability and mental retardation and orthopedic (limbs) as major disabilities. As related to Hispanics, the only high cost disability type was other conditions as a secondary disability.

Thus, consistent with previous findings, when race was controlled, there were similarities in the theoretical and social variables that accounted for the variance in cost of services. That is, time spent in the rehabilitation program and number of services provided continued to incur the highest expenditure of funds. Likewise, the expensive disability categories were orthopedic impairments, blindness, deafness, and hearing impairment. Accordingly, the disability types which received significantly less money were again found to be drug abuse and psychotic/psychiatric conditions. An interesting exception occurred in the Hispanic model; clients with visual impairment as a major disability tended to receive significantly less money.

The results from the multiple regression analyses of the disability types indicated that the more effective models of predictors of cost included the following:

- (1) Blindness (29%)
- (2) Deafness (39%)
- (3) Hearing Impairment (35%)
- (4) Orthopedic, limbs (42%)
- (5) Drug Abuse (32%)
- (6) Orthopedic, one upper (22%)

The models less effective as models account for cost variance included the following:

- (1) Visual Impairment (18%)
- (2) Upper Orthopedic (15%)
- (3) Other Orthopedic (20%)

(4) Absence one upper, one lower (7%)

(5) Mental Retardation (14%)

(6) Other Conditions (14%)

In general, when type of disability was controlled, time spent in VR and number of services provided were consistently the two most influential predictors of the cost of services. In eight out of 14 analyses, time spent in VR was the best predictor and number of services provided was second best, in order. Five times out of 14, number of services was the best predictor and time spent in VR was the second best predictor. For major disability number five (orthopedic, limbs), the best predictor was found to be blindness as a secondary disability. Likewise, for this disability, the second best predictor was number of services provided; time spent in VR was third; and referral from a rehabilitation facility was last. With regards to the major orthopedic disabilities (limbs, lower extremities, and absence of one upper and one lower extremity), referral number two (rehabilitation facility) produced a significant influence on the cost of services.

Thus the findings from the disability regression models served as a confirmation of the reported findings from the previous models. The identical theoretical and social variables continued to account for a significant amount of the variance. The variables that continued to be related to higher expenditures of cost were time spent in the rehabilitation program, number of services provided, orthopedic impairments, and blindness.

Again, variations in the expenditure of funds on the basis of race were observed. In the drug abuse, mental retardation, and other conditions models, Whites received significantly more money than the other racial/ethnic groups. Yet, in the previously reported saturated regional and racial models, less money was expended on clients in those very same categories. Similarly, Asians who experienced mental retardation as a major disabling condition received significantly more money than other racial/ethnic clients. These regression findings were consistent with the summary analysis which examined money spent on clients with different racial/ethnic backgrounds, but with the same disabilities. That is, race was associated positively with cost of services for Whites and Asians for persons with psychotic disabilities, drug abuse, retardation, and other disability, but race predicted cost of services negatively for African Americans and Hispanics for these same disabilities.

Other factors which significantly predicted cost in the disability models were the referral status variables. For example, referral from a rehabilitational facility was related to a high cost expenditure, while referral from an educational facility was related to a low cost expenditure.

The Importance of Race/Ethnicity in Process Activities

Two of the research questions addressed issues of racial/ethnic differences in process activities. Those questions were investigated by means of the regional regression models and

the fully saturated models across regions and disabilities. The specific research questions were:

Research Question Seven: What services show variation in delivery according to race/ethnicity and what variables are they related to (e.g type of disability)? Is the national pattern similar to the regional patterns.

Research Question Eight: To what extent are there differences among ethnic groups in costs for "purchased" services versus "in-house" services?

The results of the analysis for racial/ethnic differences in services provided were not substantial. For example, regardless of group membership, the bulk of services received by any one group was always diagnosis and evaluation. The only notable difference occurred for African Americans who appeared to be getting slightly more adjustment training than clients in other racial/ethnic groups. None of these differences, however, could be attributed to differences in other factors, such as type of disability.

The Cramer's V statistic which was employed for the purpose of measuring the strength of associations among new weekly earnings, race, and source of service for various service sample groups, also revealed small racial/ethnic differences in process activities. For a few of the services, some small but meaningful patterns emerged. Those include relationships between weekly earnings and transportation, adjustment training, and on-the-job training. Clients who received these types of services outside the agency tended to have higher weekly earnings. However, the findings revealed that the strength of association between new weekly

earnings and source of service for most of the service sample groups was so weak as to be inconsequential.

It is also noteworthy that race/ethnicity was not highly correlated with whether the services were purchased or not, or with new weekly earnings at closure. Thus, while a few of the services when purchased outside the program were marginally associated with positive outcomes as measured by new weekly earnings, for the most part, there were little racial/ethnic differences in whether those services were purchased or not, and little differences in the program of such services in general.

Determining Outcome

The final set of research questions examined the effectiveness of selected variables in predicting client outcomes at closure. The questions were examined by means of the multiple regression analyses and discriminant analyses. Those questions included:

Research Question Nine: To what extent are economic outcomes related to cost of services provided?

Research Question Ten: Are reported purchased service amounts predictive of client economic outcomes and gains?

Research Question Eleven: Is there an association between levels of expenditures and client outcomes?

Research Question Twelve: If more money is spent on a client, is he or she more likely to be placed into jobs providing higher levels of wages?

Research Question Thirteen: Does a higher level of expenditure mean that the client will typically show a greater gain in economic functioning from application to closure?

Weekly Earnings. Factors found to influence earnings at closure or new earnings at closure (as compared to program entry) included the clients' educational level and economic independence upon entrance in the program (e.g., not being on SSDI benefits and public assistance). It is also worth mentioning that clients working in sheltered workshops tended to have less weekly earnings than most other work status categories. In general, the findings suggest that most of the variance in weekly earnings at closure was accounted for by factors other than services provided by the rehabilitation program.

Some racial/ethnic differences in weekly earnings were noted. Whites and Asians and Native Americans at closure earned more money than African Americans and Hispanics. But Whites and Asians were a lot more educated than Hispanics. For earnings of African Americans, however, we could not find such an explanation since they had a comparable education to Native Americans and a lot more than Hispanics.

Work Status. The discriminant function analysis most clearly differentiates between clients who ended up in the competitive labor market and those who worked in sheltered workshops and those categorized as homemakers. The former group of clients tended to be better off economically at the beginning of the program. In addition, another discriminant function analysis found that factors that differentiated being employed clients and unemployed clients was whether they had private relief as a source of support and how many services were provided during the program. Employed clients

had more services provided to them and were less likely to have had private relief as a source of support. Those findings, or at least the one pertaining to the number of services, was substantiated by other data which suggest that employed clients had slightly more money spent on them than the unemployed ones. Of particular note in this latter regard were the racial/ethnic differences in employment status. Although Whites and Asians had some of the better employment rates, African Americans had the best.

CONCLUSIONS AND RECOMMENDATIONS

The main thrust of this study was to examine the factors that influenced variations in the cost of purchased services in the delivery of rehabilitation services to race/ethnic groups. Data analyses confirmed significant variations in services and costs within regions among race ethnic groups. Two variables namely, time spent in VR and the number of services accounted for 19% of the variance in the cost of purchased services. Further analyses indicated a cluster of 15 other factors (which included race/ethnicity) accounted for an additional 2% of the variance in the cost of purchased services. Apparently, there are some other factors that may contribute significantly to the variations in cost of services. Thus, this study generates new questions and emphasizes the need for a continued effort on the part of RSA to probe and find answers. What is clear is that, in general, individuals from African American, Hispanic American, and Native American groups do not have as much money spent on their services as do persons from White or Asian groups. In light of this fact, we make the recommendations listed below in the spirit of providing guidance for more effective service to all persons with disabilities including minority persons. We believe that effective implementation of these recommendations will at least minimize the existing variations in the cost of services and pave the way for equity in services provided to individuals from all race/ethnic groups. Research questions that examined the effectiveness of selected variables in predicting client outcomes at closure

indicate that educational level and economic independence upon entrance in the program were two major influences on earnings at closure. The inferences from this finding are: (a) Consumers from racial/ethnic minority groups, especially African Americans, American Indians, and Hispanic Americans, enter the VR program with relatively less education; (b) since education is closely linked to economic status, these consumers are very likely to be economically less well-off; and (c) it is quite possible that these consumers may not be fully aware of their rights to request services, where such services are available, and how to access such services. In addition to the specific findings of this study, discussions which were held with officials at the RSA, input from selected members of the Howard University Research and Training Center advisory board, and information obtained from the existing literature have led to the recommendations in this report.

Recommendations

1. RSA should initiate aggressive outreach efforts especially targeting African Americans, American Indians, and Hispanic Americans.
2. Potential VR consumers who may be members of minority groups should be identified very early, especially while they are still in school. By jointly working with the school, and parents of the students with disabilities, VR officials could play a major role in successful transition from school to work for persons in minority groups.
3. In rural as well as urban areas, RSA should use community liaison persons as cultural brokers in providing outreach and other pertinent VR services to consumers. Effective use of community liaison persons can help to (a) disseminate information regarding VR to a community, (b) establish direct contact with consumers, (c) to provide translation and transportation services, (d) promote client advocacy, and interagency coordination.

4. Furthermore, in the urban areas, wherever possible, at least initial intake service should be made available at the consumer's door.

5. VR counselors should be provided with the training that would facilitate their understanding of consumers from different cultural/linguistic backgrounds. Special recognition/awards may be given to VR counselors who successfully close cases of minority consumers.

6. Since time spent in VR is an important variable for successful rehabilitation outcome, VR counselors should be encouraged to keep minority consumers actively participating in the VR process for a longer period of time. VR counselors, for example, should work with consumers' family and community agencies in order to achieve active participation of the client in the process.

7. VR agencies need to network and provide higher education training to consumers from minority groups by pooling their resources with community colleges and other governmental agencies.

8. Regional and state agencies should be encouraged to develop effective service models and resources specific to the region/state and communities in collaboration with Rehabilitation Research and Training Centers which focus on individuals with disabilities from minority communities. Such models may be developed using a participatory approach which will include the community, consumers, and families in the planning, design, and implementation.

9. There is also a need among state or regional programs to share information about the effective models that are created and how they work. RSA should organize special meetings among regions and create opportunities for the dissemination of different experiences among state programs. (Regional RCEP projects such as the Rehabilitation Cultural Diversity Initiative may provide a forum for such exchange of information among state VR agencies.)

10. Rehabilitation education programs at various universities need to include specific courses related to multicultural issues and the need for unique service designs for specific minority communities. More persons from minority communities should be encouraged to pursue courses in rehabilitation and to seek jobs with state VR agencies.

11. There is a need for more tribally operated VR projects. State VR projects need to collaborate with nearby tribal governments and help them develop and operate their own VR projects.

12. RSA should make a thorough examination of all possible variables that may hinder minority persons from staying in the VR program for longer periods. (As the commissioner of the RSA remarked in the meeting where the preliminary findings were presented, such a future study needs to explore whether these variables are client related or agency related. This study should be carried out first within each state agency and region. This will help control variations within regions).

Two models that became very effective in providing services to American Indians are worth mentioning here. The Division of Vocational Rehabilitation in the state of New Mexico introduced bilingual rehabilitation technicians within the pueblo communities. This step led to not only an increase in the number of American Indians on VR case-loads, but it also increased the number of successful closures. The Texas Rehabilitation Commission, in collaboration with a research and training center in Arizona, conducted needs assessments of Native Americans in Dallas and Houston areas and increased its American Indian case-loads by outreach efforts and hiring new counselors who were American Indians or Hispanic Americans.

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GLOSSARY

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Glossary
Major Disability

MAJ1 - Blind (100-19)
MAJ2 - Other Visual Impairment (120-149)
MAJ3 - Deaf (231-259)
MAJ4 - Hearing Impairment (261-289)
MAJ5 - Ortho Limb (300-319)
MAJ6 - Ortho 1 Up (320-339)
MAJ7 - Ortho Upper (340-359)
MAJ8 - Ortho Lo (360-379)
MAJ9 - Ortho Other (380-399)
MAJ10 - Absence 1 upper 1 lower (400-499)
MAJ11 - Psychotic (500,526,510,522)
MAJ12 - Drug Abuse (520,521)
MAJ13 - Mental Retardation (524,530,532,534)
MAJ14 - Other (600-699)

**Glossary
Secondary Disability**

SEC1 - Blind (100-19)
SEC2 - Other Visual Impairment (120-149)
SEC3 - Deaf (231-259)
SEC4 - Hearing Impairment (261-289)
SEC5 - Ortho Limb (300-319)
SEC6 - Ortho 1 Up (320-339)
SEC7 - Ortho Upper (340-359)
SEC8 - Ortho Lo (360-379)
SEC9 - Ortho Other (380-399)
SEC10 - Absence (400-499)
SEC11 - Psychotic (500,526,510,522)
SEC12 - Drug Abuse (520,521)
SECJ13 - Mental Retardation (524,530,532,534)
SEC14 - Other (600-699)

Glossary
Race/Ethnic

- RACE1 - White
- RACE2 - African American
- RACE3 - American Indian/Al Native
- RACE4 - Asian/Pacific Islander
- RACE5 - Hispanic

Glossary
Referral

- REF1 - Education (10-19)
- REF2 - Rehab Facility (20-30)
- REF3 - Public Facility (32-53)
- REF4 - Other Public Facility (54-60)
- REF5 - Private (62-79)

Glossary
Work Status Categories

- 1 = Competitive Categories**
- 2 = Sheltered Workshop**
- 3 = Self Employed**
- 4 = Business Enterprise**
- 5 = Homemaker**
- 6 = Unpaid Family worker**

Glossary
Primary Source of Support at Closure

- 00 = Current Earnings
- 01 = Family and Friends
- 02 = Private Relief Agency
- 03 = Public Assist (Fed)
- 04 = Public Assist (Non-Fed)
- 05 = Public Institution
- 06 = Workmen's Compensation
- 07 = SSDI Benefits
- 08 = Other Public Sources
- 09 = Annuity
- 10 = Other Sources

APPENDICES

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APPENDIX A

**Stepwise Multiple Regression Analyses
Agencies**

TABLE A1

Multiple Regression for Cost of Purchased Services for the
Ortho Disability

Agency #3

Dependent Variable: Cost of Purchased Services

Dependent Variable	Mult R	Beta in	Beta	T	Sig T
Time VR	.39	.39	.37	6.55	.0000
Number of Services	.44	.18	.20	3.66	.0003
Grade	.46	.16	.14	2.59	.0100
White	.49	.11	.12	2.07	.0394
Ref 1	.51	.11	.19	3.23	.0014
Ref 5	.52	.16	.17	2.95	.0035

R = .52

R² = .27

N = 251

F = (6,244) 14.92 P = .0000

TABLE A2

Multiple Regression for Cost of Purchased Services for the
Ortho Disability

Agency #31

Dependent Variable: Cost of Purchased Services

Dependent Variable	Mult R	Beta in	Beta	T	Sig T
Number of Services	.62	.62	.32	4.27	.0000
Time VR	.70	.39	.35	3.92	.0002
Asian	.73	.21	.21	2.80	.0063

R = .73

R² = .53

N = 93

F = (3,89) = 32.87, P = .0000

TABLE A3

Multiple Regression for Cost of Purchased Services for the
Ortho Disability

Agency #32

Dependent Variable: Cost of Purchased Services

Dependent Variable	Mult R	Betain	Beta	T	Sig T
Number of Services	.58	.58	.48	4.22	.0001
Time VR	.66	.34	.29	2.55	.0145
Black	.71	.26	.29	2.77	.0082
Gender	.75	.25	.25	2.41	.0203

R = .75

R² = .56

N = 46

F = (4,41) = 13.30 P = .0000

TABLE A4

Multiple Regression for Cost of Purchased Services for the
Ortho Disability

Agency #32

Dependent Variable: Cost of Purchased Services

Dependent Variable	Mult R	Betain	Beta	T	Sig T
Number of Services	.48	.48	.41	6.18	.0000
Time in VR	.58	.32	.36	5.38	.0000
White	.61	.17	.15	2.31	.0224
Ref 1	.62	-.15	-.15	2.17	.0313

R = .61

R² = .39

N = 155

F = (4,150) = 23.65, P = .0000

TABLE A5

Multiple Regression for Cost of Purchased Services for the
Ortho Disability

Agency #3

Dependent Variable: Cost of Purchased Services

Dependent Variable	Mult R	Beta in	Beta	T	Sig T
Time VR	.39	.39	.34	4.51	.0000
Hispanic	.46	.25	.25	3.27	.0013
Number of Services	.48	.15	.15	1.98	.0492

 $R = .48$ $R^2 = .23$ $N = 140$ $F(3,136) = 13.86, P = .0000$

TABLE A6

Multiple Regression for Cost of Purchased Services for the
Ortho Disability

Agency #43

Dependent Variable: Cost of Purchased Services

Dependent Variable	Mult R	Betain	Beta	T	Sig T
Time VR	.26	.26	.24	2.89	.0045
Number of Services	.35	.23	.27	3.23	.0016
Asian	.40	-.19	-.19	2.82	.0242
Hispanic	.43	.17	.17	2.11	.0373

R = .43

R² = .19

N = 129

F = (4,124) = 7.16, P = .0000

APPENDIX B

**Stepwise Multiple Regression Analyses
Demographic, Disability, and Referral Variables**

Regions

Table B-1
Multiple Regression Analysis
Region 1

Dependent Variable: **SERVCOST** (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
NUMOFSER	78.51	.42	10.67	.000
TIME-VR	5.65	.35	8.68	.000
MAJ 11	276.09	.14	3.60	.000
SEC 2	818.48	.10	2.65	.008
MAJ 1	432.82	.10	2.58	.010
MAJ 5	654.09	.12	3.04	.003
SEC 13	1638.96	-.10	-2.61	.009
MAJ 6	1022.07	.08	2.11	.035
GENDER	226.75	.08	2.07	.039

Multiple R = .6730
 $R^2 = .4530$
Adjusted $R^2 = .4402$
N = 397

Table B-2

Multiple Regression Analysis
Region 2

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
NUMOFSER	141.02	.28	7.03	.000
TIME-VR	8.64	.22	5.51	.000
SEC 3	1704.26	.18	4.71	.000
GRADE	67.81	.10	2.64	.009
RACE 4	1022.86	.09	2.33	.020

Multiple R = .4716

R^2 = .2224

Adjusted R^2 = .2154

N = 558

Table B-3

**Multiple Regression Analysis
Region 3**

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
NUMOFSER	9.52	.29	8.32	.000
TIME-VR	132.24	.18	4.98	.000
MAJ 10	1094.30	.14	4.09	.000
MAJ 9	665.61	.10	2.94	.003
MAJ 14	446.06	.09	2.50	.012
REF 5	366.89	-.07	-2.07	.039

Multiple R = .4153

R² = .1725

Adjusted R² = .1657

N = 734

Table B-4
Multiple Regression Analysis
Region 4

Dependent Variable: **SERVCOST** (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
NUMOFSER	58.63	.36	17.75	.000
TIME-VR	5.71	.15	7.09	.000
REF 5	173.83	.05	2.50	.013
SEC 14	181.32	.05	2.48	.013
MAJ 12	244.74	-.07	-3.17	.002
MAJ 11	207.52	-.06	-3.01	.003
RACE 1	179.46	.05	2.27	.023

Multiple R = .4452

$R^2 = .1982$

Adjusted $R^2 = .1955$

N = 2054

Table B-5
Regression Analysis
Region 5

Dependent Variable: **SERVCOST** (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
TIME-VR	5.90	.34	13.41	.000
NUMOFSER	70.80	.29	11.41	.000
SEC 6	996.88	.09	3.72	.000
SEC 1	1715.31	.09	3.83	.000
MAJ 3	900.94	.07	2.93	.003
GRADE	51.42	.07	2.95	.003
SEC 3	1181.02	.06	2.38	.018
SEC 12	337.59	-.05	-2.09	.037

Multiple R = .5584
 R^2 = .3118
Adjusted R^2 = .3071
N = 1168

Table B-6

Multiple Regression Analysis
Region 6

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
TIME-VR	4.90	.28	12.12	.000
NUMOFSER	57.14	.26	10.92	.000
MAJ 6	639.04	.13	5.46	.000
MAJ 2	346.98	.11	4.56	.000
REF 2	290.99	.10	4.28	.000
MAJ 1	302.60	.07	2.86	.004
SEC 14	183.02	.07	2.67	.008
MAJ 9	269.44	-.06	-2.57	.010
GENDER	167.15	.06	2.56	.010
RACE 2	219.11	-.05	-1.98	.048

Multiple R = .4570
 R^2 = .2088
Adjusted R^2 = .2036
N = 1545

Table B-7

Multiple Regression Analysis
Region 7

Dependent Variable: **SERVOST** (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
TIME-VR	13.35	.24	5.31	.000
MAJ 1	1209.31	.23	4.96	.000
NUMOFSER	149.11	.23	5.04	.000
RACE 4	1731.34	.12	2.56	.011
RACE 2	889.34	-.12	-2.47	.014

Multiple R = .4515

R^2 = .2038

Adjusted R^2 = .1934

N = 387

Table B-8

Multiple Regression Analysis
Region 8

Dependent Variable: **SERVCOST** (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
TIME-VR	5.04	.43	10.88	.000
NUMOFSER	70.92	.29	7.22	.000
GRADE	45.25	.12	3.15	.002
REF 2	334.03	-.10	-2.68	.008
SEC 2	725.24	.08	2.01	.045

Multiple R = .6078

R^2 = .3695

Adjusted R^2 = .3621

N = 435

Table B-9

Multiple Regression Analysis
Region 9

Dependent Variable: **SERVCOST** (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
TIME-VR	5.74	.31	13.59	.000
NUMOFSER	51.32	.07	3.20	.001
RACE 4	190.42	.06	2.59	.010
SEC 8	378.43	.07	3.02	.003
MAJ 8	408.73	.05	2.28	.023
MAJ 9	313.11	-.05	-2.03	.042

Multiple R = .3524

R^2 = .1242

Adjusted R^2 = .1211

N = 1694

Table B-10

**Multiple Regression Analysis
Region 10**

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
TIME-VR	8.55	.38	8.66	.000
NUMOFSER	68.31	.21	4.78	.000
SEC 4	779.97	.15	3.32	.001
MAJ 4	1095.36	.14	3.24	.001
RACE 3	387.47	-.10	-2.26	.025
SEC 5	1886.05	.09	1.98	.048

Multiple R = .5370
R² = .2883
Adjusted R² = .2769
N = 381

APPENDIX C

Stepwise Multiple Regression Analyses

Race/Ethnicity

Table C-1
Multiple Regression Analysis
Race 1 (White)

Dependent Variable: **SERVCOST** (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
TIME-VR	2.79	.31	26.13	.000
NUMOFSER	34.52	.25	21.73	.000
MAJ 5	295.21	.08	6.57	.000
MAJ 1	237.15	.04	3.43	.001
MAJ 10	415.64	.03	2.74	.006
REF 2	169.54	.04	3.75	.000
MAJ 12	195.89	-.05	-3.75	.000
REF 1	156.68	-.05	-3.84	.000
MAJ 11	153.70	-.04	-3.16	.002
MAJ 4	224.28	-.04	-3.25	.001
SEC 12	167.85	-.03	-2.30	.022

Multiple R = .4643

F = 152.9071

p = .000

R² = .2156

Adjusted R² = .2142

N = 6130

Table C-2

Multiple Regression Analysis
Race 2 (African American)

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
NUMOFSER	53.09	.32	14.83	.000
TIME-VR	5.16	.24	10.28	.000
SEC 12	224.92	-.07	-3.18	.002
MAJ 1	365.19	.06	2.68	.007
REF 2	256.71	.06	2.70	.007
MAJ 12	240.46	-.07	-2.88	.004
REF 1	241.60	-.05	-2.37	.018

Multiple R = .4686

F = 72.7837

p = .0000

R² = .2196

Adjusted R² = .2165

N = 1819

Table C-3

Multiple Regression Analysis
Race 3 (American Indian/AL Native)

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
TIME-VR	5.00	.32	8.49	.000
NUMOFSER	64.08	.26	6.96	.000
SEC 4	584.30	.13	3.44	.001
SEC 14	214.34	.12	3.15	.002
MAJ 8	420.89	.11	2.99	.003

Multiple R = .4852 F = 34.2341 p = .0000
R² = .2354
Adjusted R² = .2285
N = 562

Table C-4

Multiple Regression Analysis
Race 4 (Asian/Pacific Islander)

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
TIME-VR	8.97	.39	11.62	.000
SEC 3	1676.39	.13	3.89	.000
NUMOFSER	93.81	.12	3.58	.000
SEC 8	705.98	.10	3.20	.000
REF 1	420.99	-.11	-3.36	.001
MAJ 13	460.24	.09	2.63	.009
MAJ 5	949.21	.06	2.01	.045

Multiple R = .4556

F = 29.0758

p = .0000

R² = .2076

Adjusted R² = .2004

N = 785

Table C-5

Multiple Regression Analysis
Race 5 (Hispanic)

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	Beta	T	SIG T
TIME-VR	6.25	.23	6.44	.000
NUMOFSER	89.74	.24	6.77	.000
SEC 14	290.02	.09	2.51	.012
REF 2	454.06	.10	2.73	.007
MAJ 2	451.57	-.08	-2.26	.024

Multiple R = .3888

F = 24.9951

p = .0000

R² = .1511

Adjusted R² = .1451

N = 708

APPENDIX D

**Stepwise Multiple Regression Analyses
Major Disabilities**

Table D-1

**Multiple Regression Analysis
Major Disability 1 (Blindness)**

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	BETA	T	SIG T
NUMOFSER	149.96	.31	9.17	.000
TIME-VR	11.12	.27	7.99	.000
SEC 3	1577.09	.10	3.22	.001
SEC 11	116.65	.11	3.38	.001
GENDER	504.48	.08	2.44	.015

Multiple R = .5340

F=55.9161

p=.000

R² = .2851

Adjusted R² = .2800

N = 707

Table D-2

Multiple Regression Analysis
Major Disability 2 (Visual Impairment)

Independent Variables	SE B	BETA	T	SIG T
NUMOFSER	114.46	.28	6.99	.000
TIME-VR	6.94	.25	6.37	.000

Multiple R = .4286
 $R^2 = .1837$
Adjusted $R^2 = .1808$
N = 563

F=63.0050

p=.000

Table D-3

Multiple Regression Analysis
Major Disability 3 (Deafness)

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	BETA	T	SIG T
TIME-VR	13.94	.45	7.63	.000
NUMOFSER	201.91	.32	5.32	.000
SEC 3	2793.48	.16	2.79	.006

Multiple R = .6205

F=40.2790

p=.0000

R² = .3850

Adjusted R² = .3755

N = 197

Table D-4

Multiple Regression Analysis
Major Disability 4 (Hearing Impairment)

Dependent Variable: **SERVCOST** (Amount of Purchased Services)

Independent Variables	SE B	BETA	T	SIG T
TIME-VR	5.99	.49	11.98	.000
NUMOFSER	94.52	.20	4.97	.000
SEC 3	1189.24	.09	2.34	.020

Multiple R = .5938

F=76.4413

p=.0000

R² = .3526

Adjusted R² = .3480

N = 425

Table D-5

Multiple Regression Analysis
Major Disability 5 (Ortho Limbs)

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	BETA	T	SIG T
SEC 1	8053.77	.42	8.29	.000
NUMOFSER	267.05	.25	5.02	.000
TIME-VR	16.81	.20	3.84	.000
REF 2	1310.12	.13	2.74	.007

Multiple R = .6445

F=44.5717

p=.0000

R² = .4153

Adjusted R² = .4060

N = 256

Table D-6

Multiple Regression Analysis
Major Disability 6 (Ortho 1 Upper)

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	BETA	T	SIG T
NUMBOFSE	234.82	.31	4.72	.000
TIME-VR	17.12	.29	4.45	.000

Multiple R = .4693

F=26.6897

p=.0000

R² = .2202

Adjusted R² = .2120

N = 192

Table D-7

Multiple Regression Analysis
Major Disability 7 (Ortho Upper)

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	BETA	T	SIG T
TIME-VR	11.65	.35	5.92	.000
NUMBOFSER	148.32	.18	2.99	.003

Multiple R = .3876

F=22.5363

p=.0000

R² = .1502

Adjusted R² = .1435

N = 258

Table D-8

Multiple Regression Analysis
Major Disability 8 (Ortho Lower)

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	BETA	T	SIG T
TIME-VR	9.15	.28	6.63	.000
NUMBOFSER	135.86	.26	6.01	.000
REF 2	746.04	.16	3.81	.000

Multiple R = .4465

F=39.7546

p=.0000

R² = .1994

Adjusted R² = .1943

N = 483

Table D-9

Multiple Regression Analysis
Major Disability 9 (Other Ortho)

Dependent Variable: **SERVCOST** (Amount of Purchased Services)

Independent Variables	SE B	BETA	T	SIG T
TIME-VR	7.57	.32	9.74	.000
NUMBOFSER	95.45	.22	6.69	.000

Multiple R = .4226

F=86.9788

p=.0000

R² = .1786

Adjusted R² = .1766

N = 803

Table D-10

Multiple Regression Analysis
Major Disability 10 (Absence 1 Upper and 1 Lower)

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	BETA	T	SIG T
TIME-VR	7.57	.32	9.74	.000
NUMOFSER	95.45	.22	6.69	.000

Multiple R = .2743

F=18.532

p=.0000

R² = .0752

Adjusted R² = .0743

N = 155

Table D-11

Multiple Regression Analysis
Major Disability 11 (Psychotic Disorders)

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	BETA	T	SIG T
NUMOFSER	39.23	.32	15.72	.000
TIME-VR	3.73	.26	12.52	.000
REF 4	192.97	-.06	-2.74	.006
SEC 13	206.52	.06	3.04	.002
SEC 6	890.23	.05	2.40	.016
REF 2	192.67	.05	2.40	.016

Multiple R = .4629

F=89.4076

p=.0000

R² = .2189

Adjusted R² = .2165

N = 1921

Table D-12

Multiple Regression Analysis
Major Disability 12 (Drug Abuse)

Dependent Variable: SERVCOST (Amount of Purchased Services)

Independent Variables	SE B	BETA	T	SIG T
TIME-VR	2.73	.46	22.98	.000
NUMOFSER	26.81	.26	13.28	.000
RACE 1	83.79	.06	2.88	.004
SEC 14	133.49	.04	2.21	.027
SEC 5	716.52	-.04	-2.21	.027

Multiple R = .5678

F=171.6336

p=.0000

R² = .3224

Adjusted R² = .3205

N = 1810

Table D-13

Multiple Regression Analysis
Major Disability 13 (Mental Retardation)

Dependent Variable: **SERVCOST** (Amount of Purchased Services)

Independent Variables	SE B	BETA	T	SIG T
NUMOFSER	52.16	.31	11.90	.000
TIME-VR	5.67	.17	6.31	.000
REF 1	194.03	-.10	-3.46	.001
RACE 1	193.02	.07	2.68	.007
RACE 4	342.27	.06	2.02	.044

Multiple R = .3712

F=49.8762

p=.0000

R² = .1377

Adjusted R² = .1375

N = 1332

Table D-14

Multiple Regression Analysis
Major Disability 14 (All Other Conditions)

Dependent Variable: **SERVCOST** (Amount of Purchased Services)

Independent Variables	SE B	BETA	T	SIG T
TIME-VR	4.79	.28	12.66	.000
NUMOFSER	59.51	.19	8.74	.000
REF 1	245.28	-.09	-3.33	.001
REF 5	219.12	.06	2.21	.028
RACE 1	185.86	.04	2.12	.034
SEC 11	197.16	-.04	-2.08	.038

Multiple R = .3725

F=52.3375

p=.0000

R² = .1388

Adjusted R² = .1361

N = 1956